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VISCERAL DISTURBANCES IN PATIENTS WITH CUTANEOUS LESIONS OF THE ERYTHEMA GROUP *

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In several papers under a title similar to the one which I have chosen for the chairman's address to the Section on the Practice of Medicine, Sir William Osler[1] collected a group of cases presenting a variety of symptoms but having in common skin lesions of the erythema group. Much interest attaches to cases of this type. Often diagnostic errors are made in them, especially when the skin lesions do not occur in close relation to the visceral manifestations. Puzzling combinations of symptoms appear, some of an almost fulminant type. Abdominal symptoms may lead to needless exploratory operations. Hematuria may suggest nephritis or renal neoplasm, etc. Renal changes analogous to those seen in the skin may lead to such a diminution of renal function as to cause uremia, or perhaps here there is an actual severe acute nephritis to which the skin lesions are secondary. The skin lesions are protean in type as indicated by the variety of names our dermatologic friends apply, as erythema simplex, erythema multiforme, erythema iris, erythema urticans, erythema nodosum, erythema papulatum, herpes iris, urticaria, urticaria pigmentosa, angioneurotic edema, purpura simplex, purpura hemorrhagica, peliosis rheumatica, etc.

Osler, I think, deserves much credit for grouping these cases together and emphasizing their common basis. To regard them as having a close relationship to each other seems to me much simpler than to regard them as different clinical entities. Perhaps Osler went too far in including some of the cases; that he did so seems to me likely. Synthesis of skin and visceral lesions, however, into an entity in which various combinations of erythema, hemorrhage, edema and exudation occur both in the skin surfaces and within the body, yields a better comprehension of the process than multiple subdivisions with different names according to where the lesion is and what predominates in it. This is particularly evident when one recalls the frequency with which a single patient shows in successive crops of skin lesions wide variations in form, with the skin lesion now accompanied by abdominal colic, or joint pains, etc., and now without them.

In more recent years with frequent therapeutic use of large amounts of foreign serums, serum sickness has become a well recognized syndrome. Cases of the type which Osler described in his papers bear close resemblance in many phases to these patients with serum sickness, and this gives a further reason for regarding them as being entitled to be grouped together, although in this erythema group very little is known about the etiology.

My justification for bringing this group again to your attention is their very great clinical interest and the not infrequent mistakes made in their diagnosis. I have but little to add to what Osler has so well said of them in his papers, but I can illustrate the condition fairly well by reporting some cases which I have observed recently myself, and in so doing can emphasize again some of their interesting and important features. In reviewing my experience with these patients I will not include the simpler cases in which with the skin lesions there are but few visceral manifestations beyond slight arthralgia or arthritis nor those in which purpura, urticaria, etc., are clearly but incidents or complications in the later course of some such chronic condition as nephritis, cardiac disease, cirrhosis, etc., or part of an acute infection such as tuberculosis, acute endocarditis, etc., although these may properly belong in the group on the basis of similarity of skin lesion and possibly a common, though as yet unknown, cause for the skin lesion.

REPORT OF CASES

CASE 1 (Med. No. 56).—*Urticaria, albuminuria, hyperpermeability of the kidney.*—A year before entering the hospital, a man, aged 22, noticed a rash on his forearm and chest which itched and lasted for one to two hours. From that time a similar rash appeared almost daily, usually in the afternoon, one-half to one hour after the mid-day meal, sometimes not until later in the day. The rash consisted of small white spots with red borders which would appear first on the wrists, then spread upward to the forearms, then to the upper arms, across the chest and finally down to the legs. In one to two hours it would disappear in the order of its appearance. About three months ago he examined his own urine and found albumin. This albumin varied in amount and in some specimens was absent. It was not, however, an orthostatic albuminuria inasmuch as the specimens free from albumin might occur when the patient was up and about and many specimens passed with the patient flat in bed showed albumin. Albumin seemed to appear more constantly in specimens passed two to four hours after a meal containing a considerable amount of protein. There was no relationship between the albuminuria and the occurrence of the urticarial lesions. Urine specimens did not show casts and the renal function as measured by the phenolsulphonephthalein excretion, the excretion of lactose and potassium iodid seemed to be quite

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* Chairman's address, read before the Section on Practice of Medicine at the Sixty-Eight Annual Session of the American Medical Association, New York, June, 1917.

1. Osler: On the Visceral Complications of Erythema Exudativum Multiforme, Am. Jour. Med. Sc., 1893, **110**, 629; Visceral Lesions of the Erythema Group, Brit. Jour. of Dermatol., 1900, **12**, 227; On the Visceral Manifestations of the Erythema Group of Skin Diseases, Am. Jour. Med. Sc., 1904, **127**, 1; On the Surgical Importance of the Visceral Crises in the Erythema Group of Skin Diseases, Am. Jour. Med. Sc., 1904, **127**, 751.

normal. The total nonprotein nitrogen of the blood was normal, so that there seemed to be no definite evidence of a nephritis.

CASE 2 (Med. No. 1016).—*Purpura, abdominal pain, blood in the stools.*—A woman, aged 45, two weeks before admission, noticed red spots on the legs below the knee and then they appeared on the hands, forearms and lower abdomen. Those on the arms itched slightly. They varied in size from a pinhead to 0.5 cm. in diameter, at first bright red and then turning a darker red. On the day of admission a slight swelling which was red and quite tender appeared on the left instep and two days later a slightly painful lump appeared in the middle of the forehead about 3 cm. in diameter which was raised about 0.5 cm. above the level of the forehead. At this time pain began to develop in her legs. The next day her left knee was painful on motion and her left ring finger was swollen at the second phalangeal joint. The left shoulder joint was tender on palpation. The patient had a very slight fever. A day or two later the patient had an attack of vomiting at night and the next day there was a new crop of skin lesions more papular than previously and more numerous on the face. The joint pains persisted for four to five days, varying in intensity. Two weeks after admission she complained of extreme pain in the lower portion of the abdomen. The abdomen was markedly distended, more or less rigid and was tympanitic throughout. The pulse became smaller, the heart sounds were weak, but she had no fever at this time. She was given several high enemas and the pain gradually disappeared, though the distention persisted somewhat longer. Two days later, however, the abdomen felt perfectly normal and the pain had entirely disappeared from the abdomen. A number of stools examined from the time of admission up to this period of abdominal pain showed strongly guaiac tests. Then the stools became negative for blood tests and thereafter for a period of nearly a month the guaiac tests were sometimes positive, sometimes negative. During this period the patient's condition greatly improved, and she left the hospital feeling comparatively well. During her stay in the hospital albumin was occasionally found in her urine and an occasional cast was seen, but there was no hematuria.

CASE 3 (Med. No. 1143).—*Purpura, abdominal pain, pain and swelling of the ankles, hematuria.*—A boy, aged 13, about six weeks before admission, was suddenly seized with sharp cramplike pain in the abdomen, more severe about the region of the umbilicus. This pain did not radiate and it lasted for about ten minutes. Since then there have been many recurrences of similar paroxysms of abdominal pain and he has never been free from the sensation of discomfort in the abdomen during this time. When the pain is severe he occasionally vomits a small amount. This vomiting is not preceded by any nausea. The first two urine specimens examined in the hospital showed numerous red blood cells, subsequently none were found. The patient was distinctly emaciated; his abdomen had a doughy feel. Bismuth Roentgen-ray studies of his gastro-intestinal tract showed distinct irregularities in the pyloric and prepyloric region. The stomach emptied rather slowly. When the bismuth reached the small intestine the loops looked wide and atonic. While in the hospital the patient frequently had attacks of very intense abdominal pain which would double him up and sometimes he would vomit. At times food taken several hours previously was found in the vomitus. Ten days after the first bismuth Roentgen-ray examination a repetition showed again irregularity in the prepyloric region with a slow emptying time for the stomach. After two weeks' stay in the hospital the patient began to improve, his colic-like pains decreased, his appetite improved and he looked very much better. After nearly a month in the hospital there was a recurrence of pain in the abdomen, followed the next day by pain and swelling in the right ankle. A day later several purpuric spots appeared on the legs. These gradually faded away not to recur. During the latter part of his stay in the hospital a small amount of blood reappeared in the urine and albumin was present with an occasional cast.

CASE 4 (Med. No. 1069).—*Purpura, diarrhea, blood in the stools, abdominal pain, painful swollen joints.*—Three and one-half weeks before the patient, a girl, aged 11, came to the hospital, a rash appeared on the back of the calves and over her lower legs which gradually went up the legs and a few appeared on the trunk. Finally a rash appeared on her face. The rash was red in color and consisted of discrete, sharply defined macules. During the first three days after the rash appeared the patient vomited frequently yellow greenish material, free from visible blood. During this time her stools were dark colored. One week after the rash appeared her ankles became swollen, and two days later swelling appeared in her hands. This swelling in the hands and feet disappeared but recurred again later. When the patient came to the hospital there was slight abdominal tenderness, there was a marked macular and papular rash over the legs, feet and arms, in places dark red, in others paler, purplish or yellow in color. On one ankle there was a bleb about the size of a dime. At this time there was no obvious involvement of any joint. After two days in the hospital the patient had a stool in which there was bright red blood and a little later she involuntarily passed about 4 c.c. of blood. The next day there was diarrhea with several watery stools, most of which showed blood. On this day the right hand and arm as high as the elbow were distinctly swollen, but not very tender. Several days later there was a recurrence of the diarrhea, there being very numerous stools most of which contained blood. This persisted for several days and then diarrhea gradually decreased, though positive guaiac tests continued to be obtained in her stools for a long time. After being in the hospital for a month a new crop of purpuric spots appeared on her feet. Four days later another crop appeared on her thighs. Six days later a new crop came on her legs. A week later she again had pain in her abdomen and vomited. Shortly afterward she passed a large tarry stool. She remained in the hospital for nearly four months with frequent recurrences of what has already been outlined and then left in good condition. She was seen a year later and reported that she had had a few purpuric spots in the interval but no recurrence of the diarrhea and abdominal pain.

CASE 5 (Med. No. 3599).—*Purpura, painful joints, hematuria.*—A man, aged 25, about two weeks before admission, developed a sore throat. Five days ago his knees became a little painful on motion and after resting would feel stiff. For two days his feet have been a little swollen. Nine days ago his feet became tender and were painful when he walked about. On yesterday he had a little trouble pulling on his boots and later in the day noticed that there was a red rash about his ankles. When he came into the hospital on both ankles and over the calves of both legs there were many dark red, hemorrhagic areas from 0.5 to 8 mm. in size. A few of these were covered with fine crusts. Both tonsils were enlarged, red and slightly ragged. The urine contained a moderate amount of albumin, and numerous hyaline and granular casts. A specimen passed nearly two weeks after admission was smoky and contained many red blood cells. This was at a time when the throat had cleared up and the purpura had disappeared. After about three weeks in the hospital and when the patient had been up out of bed for three days, purpura returned over the ankles with slight pain and swelling in the ankles. The blood was very slight in amount and his urine at this time up to ten days later became more abundant. This patient had a positive Wassermann reaction and there was an ulceration in his palate. Renal function was slightly impaired as shown by the blood urea nitrogen which was 25 mg. per 100 c.c. of blood, with an index of urea excretion according to McLean's formula, of 40.5 per cent. Some time later the blood urea nitrogen was 21 mg. with an index of urea excretion of 49 per cent. The phenolsulphonephthalein test at about this time gave an excretion in two observations of 67 per cent. and 50 per cent. respectively and the urine always contained a considerable amount of albumin and numerous casts, hyaline and granular in character, so that the diagnosis of acute nephritis was also made.

CASE 6 (Med. No. 5372).—*Erythema nodosum, abdominal pain, vomiting, slight diarrhea.*—A woman, aged 27, for about four weeks had had grumbling pains in the left upper quadrant of the abdomen. On two occasions she vomited and for several periods of about a week there was slight diarrhea. Nothing abnormal was noted about the vomitus; no blood was observed in the stools. A few days ago the patient felt rather chilly and went to bed. The following morning after walking down stairs she noticed a soreness in both legs from the knee to the ankle. That night she noticed what she called "mosquito-bite like" areas over both lower legs. Two mornings ago these seemed to be fading but by today had become larger and felt lumpy. During this period there has been slight sore throat. When she came to the hospital there were numerous discrete lesions over both legs. These lesions were slightly raised, reddish-blue, or slightly yellow in color, with ill defined edges, measuring from 1 to 4 cm. in diameter. On palpation they give a distinctly nodular feel. On pressure most of the color disappears from the lesions. When she came in there was slight fever which quickly disappeared. All the gastro-intestinal symptoms likewise disappeared. Her urine examination was normal.

CASE 7 (Med. No. 5543).—*Erythema multiforme bullosum, gastric disturbance.*—A boy, aged 13, for the past five years every August has had a gastric upset with an erythema on the right side of his lower jaw. This unusally lasts five to six days. Eating strawberries often produces a little urticaria and on one occasion he had urticaria from eating fish. About a month ago the same appearance as usual occurred on his jaw. Then red spots appeared on his legs and arms. Soon a blister would form over these red spots which would break in about twenty-four hours, leaving a red area with a little black speck in the center. About five days ago blisters appeared in the mucous membrane of his mouth. On admission he showed over the mid-portion of his right lower jaw an irregular area of yellow crusts. Irregularly scattered over the arms and legs there are small areas of erythema with blackish brown spots in their centers. Over the back of his thighs there are a number of red areas, some almost entirely covered with blebs containing a serous fluid. The edges of these areas are sharply demarcated. Over the palms of the hands and the soles of the feet are a large number of blebs varying in size from a 10 cent piece to a 25 cent piece. When the blebs break it is seen that the lesion as far as ulceration is concerned is very superficial. On the lips there are similar blebs, and apparently they have occurred also on the gums, appearing here as erythematous areas slightly ulcerated. These lesions rapidly cleared during about ten days' stay in the hospital. The patient's urine was normal and there was no blood in the stools.

CASE 8 (Med. No. 5661).—*Erythema multiforme vesiculosum, abdominal pain.*—Eleven days before admission of the patient, a woman, aged 29, generalized pain in the abdomen developed. This began in the morning and got worse in the afternoon. During the night it was severe enough to prevent sleep. Her local physician saw her the next day and diagnosed the condition as salpingitis. He prescribed a vaginal douche and after a few days the pain subsided. Then the pain recurred and she went to a dispensary where she was diagnosed as having gallstones. With this attack she vomited and continued to vomit until she was sent to the hospital where she was first admitted on the surgical side. There it was found that she had an irregular, blotchy erythematous eruption over her face and almost the entire body. These erythematous areas did not seem to be elevated and they faded on pressure. The abdomen showed generalized tenderness. Her feet and ankles were swollen and tender. In twenty-four hours the skin rash had largely disappeared, leaving a slight puffiness of the face, hands and feet. The rash reappeared and a week later a different type of rash appeared on the arms and legs, consisting of small, irregular, dusky red areas, 2 to 6 mm. in diameter, which did not disappear on pressure. On the tops of many of these, small vesicles appeared which subsequently became slightly pustular. The patient now complained of abdominal tenderness and there was slight diarrhea. The urine showed a slight amount of albumin, numerous casts and a phthalein output of 15 per cent. in two hours which in two or three days had increased to 24 per cent. and a week later to 34 per cent. The patient had a moderate degree of irregular fever. At times the pain in her elbow and wrists became more severe and kept her awake. After being in the hospital for nearly a month she had a recurrence of the pain in her abdomen and her left arm from the elbow to the shoulder became swollen, tender and felt hot but it was not red. This swelling gradually subsided and the tenderness disappeared. From time to time the patient had a severe headache. She gradually improved and left the hospital feeling quite well after a stay of about two months. Before she left her phenolsulphonephthalein excretion had risen to 55 per cent.

CASE 9 (Med. No. 5908).—*Urticaria, intestinal obstruction.*—The patient, a man, aged 58, had had a large number of attacks of localized swelling in the right hand and other manifestations of urticaria. On the day before coming to the hospital he was in his usual health until the afternoon. While having tea his abdomen became distended, there was some belching of gas, he felt rather uncomfortable and went to bed. He began to have pain in his abdomen chiefly in the epigastrium and along the right costovertebral angle. His abdomen was generally distended. There was a fair bowel movement about 9 p. m. Later an enema was given and returned with very little fecal material. The distention and discomfort continued so that he slept poorly. The next morning, January 7, he came to the hospital, and his abdomen was found to be distended and diffusely painful and slightly tender. The abdomen and the character of the pain suggested distinctly intestinal obstruction. For twenty-four hours very little result was obtained from enemas or rectal tube. Then a good fecal result was obtained and the patient passed a considerable amount of gas. Forty-eight hours after admission his abdomen was much less distended and the patient was much more comfortable. Four days after admission scattered patches of erythema and edema appeared over his hands, arms and feet, which he said were similar to those that he had repeatedly had after eating fish, shellfish or canned goods that were possibly not quite good. He recalls having eaten sardines on the day that his abdominal distention and discomfort developed. These findings suggested that possibly the intestinal obstruction was due to a similar type of lesion in the intestinal wall and on the next day, January 12, bismuth Roentgen rays of his gastro-intestinal tract showed five hours after the taking of the bismuth meal in one of the upper loops of the ileum a dilatation producing a sausage-shaped shadow, the distal end of which was narrow. After this all symptoms of intestinal obstruction disappeared, a repetition of the Roentgen-ray study three days later showed no signs of a dilated loop and a repetition ten days later again gave no evidence of obstruction.

CASE 10 (Med. No. 5823).—*Purpura, arthritis, abdominal pain, hematuria, blood in the stools.*—A man, aged 20, six years ago had an attack of rheumatism in which both knees were slightly swollen and quite painful, particularly at night. Since then he has had a similar attack about once a year. About nine weeks ago another attack of rheumatism developed in which his right knee became sore. A little bit later his left knee became very painful and slightly swollen. The right knee cleared up but the left knee continued and is still swollen and painful. For a year the patient has had an ulcerated tooth in the right lower jaw with a swelling nearby from which pus exudes on pressure. Six days before he came to the hospital he began to have a sensation of pressure in the epigastrium giving him enough distress to keep him awake during the night. He raises a good deal of gas. Four days ago he began to have hiccups and to vomit about once or twice an hour. There was very little nausea. The vomitus was bitter, greenish in color, and never contained anything like blood. On admission numerous small purpuric spots were found over both elbows and over the lower part of the sacrum, which he says had been present for three to four days. A carious tooth was found as described. The left knee was somewhat larger than the right, somewhat painful, not hot, and did not appear to contain fluid. His left leg

was slightly flexed at the knee and held in that position. He had a moderate fever. During his first few days in the hospital the urine contained a very slight amount of albumin with a few hyaline casts. The phenolsulphonephthalein elimination was 42 per cent. in two hours. In his stools a strongly positive benzidin test for blood was found. The pain in his knee decreased and then after four to five days increased and at this time there appeared on the forearms, wrists, legs, ankles and feet many small slightly indurated erythematous plaques, definitely elevated and about 1 cm. in diameter. These gradually disappeared and a week after this crop had come out the patient's temperature suddenly rose to 102 F., and there was marked swelling of the left knee and a reappearance of purpuric spots on the forearms, ankles and feet. Now there were definite signs of fluid in the knee joint. The patient was unable to flex his knee on account of pain. At this time the bad tooth was extracted and pus was found about its root. For the next two weeks the temperature ranged between 99 and 100 F. Then it rose again to 102.5 F. with a fresh crop of purpuric spots on the forearms, ankles and feet. The patient had begun to cough up a considerable amount of blood. During this time a small amount of blood had appeared in his urine and the casts had increased in number. Shortly after this last group of purpuric spots appeared the urine became definitely hemorrhagic in type and thereafter contained practically always a considerable amount of blood, though different specimens might show more or less blood. After a month's stay in the hospital the patient had a definite secondary anemia but he had been free from purpuric attacks for some little time, blood in his stools was no longer found and the blood in his urine had somewhat decreased. Roentgen-ray examination of his knee shortly after this showed bony enlargement and slight irregularity but no evidence of a destructive process. Now the patient's temperature became a maintained temperature first around 101 F. and then increasing to 102 F. and finally rising to about 103 F. with a gradually increasing pulse rate. During this period the left knee has continued swollen and painful with some variations up and down in the activity of the process. After about two and one-half months' stay in the hospital with this continued fever, continued hematuria and continued activity of the process in the left knee, definite signs were made out of a pulmonary process and tubercle bacilli were isolated from the suptum in small numbers. A month prior to this, sputum examinations had shown no tubercle bacilli. A Roentgen-ray plate of the chest showed changes suggesting a diffuse miliary tuberculosis with, in places, conglomerate tuberculosis. There were no further crops of purpura and the patient died about three and one-half months after admission. At necropsy there was an acute miliary and conglomerate tuberculosis of the lungs with areas of caseous pneumonia, apparently an active and recent tubercular process. The kidneys were slightly enlarged and showed small foci of hemorrhage. On microscopic examination of the kidneys there was no nephritis but possibly a slight degenerative change in the tubular epithelium with numerous foci of intertubular and intratubular hemorrhage explaining the persistent hematuria. No tubercular lesions were found in any of the abdominal viscera. The gastro-intestinal tract seemed to be normal. The stools for a period of three months before death gave no test for blood.

COMMENT

To me it seems that the clearest conception of the condition represented by the patients just described can be obtained by regarding the disease as due to some disturbance in the small blood vessels — vessels of the capillary or precapillary and postcapillary group — almost always focal in distribution, which causes dilatation, diapedesis, exudation, singly or in combination. The ultimate cause of this disturbance is completely unknown. The areas of vascular involvement may be either in the skin surfaces, mucous surfaces, serous surfaces, subcutaneous tissues, muscles, or viscera. With this possibility of distribution symptoms may be extremely various and in recurring attacks, for the condition is usually recurrent; very different symptoms appear in the same individual.

With this in mind the variety of skin lesions is easily understood. The frequent arthritis has its analogy in the arthritis of serum sickness and the chronic joint disturbances with frequent exacerbations in some patients with hemophilia. Diarrhea, blood in the stools and abdominal colic occur as there is serous exudation or hemorrhage into the intestinal wall. Colic is due probably to local changes in the intestinal wall causing spasm. This is suggested in Case 3, where Roentgen-ray study showed evidence of muscle spasm at the pyloric end of the stomach. In the colic of chronic lead poisoning we have seen evidences in the Roentgen ray of spasm in intestine or stomach during the period of colic, which is in support of the view that observed spasm is related to gastro-intestinal disturbance. Such spasm and disturbances in the bowel wall can lead to actual intestinal obstruction, as in Case 9, where we could demonstrate the obstruction by Roentgen ray in an ileal loop.

The exact relation of the renal disturbances is not quite so clear. Hematuria could occur in the same way as blood in the stools from disturbances in renal vessels. That this does happen is well shown by Case 10, where necropsy showed focal hemorrhages in the kidney without signs of nephritis. This patient had pulmonary tuberculosis, but the clinical course and necropsy findings indicated an acute process developing during the later course of the skin and visceral disturbances of the erythema group. His urine during life yielded no tuberculosis by guinea-pig test and at necropsy no tubercular lesions were found in the kidney.

In how far these renal lesions are to be considered as acute nephritis it is difficult to say. In several of our cases functional study showed markedly decreased renal function. Five of Osler's twenty-nine reported patients died with what was termed uremia. That they had severe disturbances in renal function is evident. Whether this was nephritis or suppressed renal function from edema and hemorrhage into the kidney is not certain; there were no necropsy examinations except in one patient referred to by Osler in whom proliferative glomerular nephritis was found. Some of the uremic manifestations might easily have resulted from lesions in the brain of the same nature as those occurring in skin and viscera and not been actually uremic.

The difficulty of placing the renal lesion is well illustrated by a patient of mine at the Carney Hospital not included in the above group of cases. He was a boy of 15 who, September 15, had sudden attacks of severe colicky abdominal pain with some diarrhea. September 22, an appendix normal except for several concretions was removed. October 4, abdominal symptoms as before his appendectomy recurred and he vomited. These abdominal symptoms recurred and he came back to the hospital on October 11. A purpuric rash was found on his legs and crops of these recurred later. Now he had albumin, blood and casts in his urine. He left the hospital again, October 22, and soon developed edema. November 12, he returned in a markedly water logged condition. November 26, following a dietary indiscretion he had a series of convulsions and was stuporous. After a few days this condition cleared up and his edema dis-

appeared so that between November 18 and December 15 he lost thirty-seven pounds in weight. Six months later his urine contained much less albumin and a few casts and he looked very well. One and one half years later and three years later he was seen. The last time his urine showed a very slight trace of albumin and a very rare hyaline cast. His blood pressure was normal and for two years he had been steadily at work in a machine shop running a lathe and feeling perfectly well.

Was this a case of nephritis with a complicating purpura or does it belong to the group I have been discussing? I must confess I do not know. Abdominal pain of various types does occur often in typical chronic nephritis without skin lesions and I usually call my students' attention to this as a type of symptom in chronic nephritis, that often leads to diagnostic errors. On the other hand I am inclined to think that in many patients hematuria, albuminuria, and other renal disturbances occur as part of the disease entity here under consideration and that these renal disturbances are due to kidney lesions similar in nature to those occurring in the skin. In this sense the renal lesions are not truly those of nephritis. This probably explains why in these patients with seemingly so severe a renal lesion progression into a true chronic nephritis is not often seen.

CONCLUSIONS

There is a definite clinical entity in which with skin lesions of the erythema group (purpura, erythema, urticaria, angioneurotic edema) visceral lesions occur as the result of the same type of lesion. The most common of these visceral manifestations are arthritis, gastro-intestinal symptoms, hematuria and various disturbances of renal function. The visceral disturbances occur unaccompanied by the skin lesions. The symptomatology of the group is very complex and without the presence of the skin lesions at a given time the cases present great difficulties in diagnosis.

THE INFLUENCE OF THE HIGH CALORY DIET ON THE COURSE OF TYPHOID FEVER*

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The various studies concerning the high calory diet which have been carried out in Bellevue Hospital during the last ten years, have established beyond question the value to the individual typhoid patient of the maintenance of an optimal state of nutrition.[1] Contrary to the common belief, it was found that large quantities of selected foods could be taken without disturbance of digestion. Likewise, it was found that food is absorbed by the typhoid patient practically as completely as by healthy men. Under the high calory diet the febrile loss of body protein is reduced to a minimum or altogether prevented. Investigations of the total metabolism of typhoid patients have shown that large amounts of food are consumed with avidity, any excess over the immediate needs being laid by for future use.

None of these studies, however, furnished more than indirect evidence of the influence which the high calory diet might exert on the natural history of typhoid fever. On account of the wide variations in the course of the disease in different seasons, such evidence can be obtained only from the study of a series of cases extending over a number of years.

A statistical study has therefore been undertaken of the course of typhoid fever in patients on the high calory diet and in an equal number of patients on diets (milk, broths, egg albumin water) furnishing not more than from 1,000 to 1,500 calories a day. The number of cases available is not sufficiently large to justify comparison of the frequency of the rarer symptoms and complications; even with respect to the commoner features of the disease, only tentative conclusions are drawn unless the evidence is overwhelming.

Material.—The material consisted of 444 patients, half of them on the high calory diet and the other half on a milk diet. All of the patients were treated on the second medical division of Bellevue Hospital except forty-five of those on the milk diet. The majority of the patients were under my personal care, thus eliminating differences in the course of the disease which might be attributable to different methods of treatment other than diet. The histories cover the years from 1903 to 1914, inclusive. As far as possible, cases in corresponding years have been selected, but the use of the high calory diet became so general throughout the hospital about 1911 that, in order to complete the milk series, it was necessary to utilize 113 histories from 1903 to 1906, inclusive.

The histories were taken from the records seriatim. All patients were classified as high calory cases if the attempt had been made to nourish them liberally, even if it failed or was only partially successful.

A moderate number of histories were unsuitable for analysis, the reasons being doubt as to the diagnosis, entrance into the hospital late in the disease, and death within a week of admission. Of the fatal cases excluded, three were on the high calory diet and twelve on milk. Fifty-five of the high calory cases were mild, 149 were severe, and eighteen were fatal. Forty-four of the milk cases were mild, 104 were severe, and thirty-nine were fatal.

Duration of the Disease.—There is no evidence to indicate that the duration of the febrile period of the disease or the range of temperature is affected by diet except, perhaps, that long recrudescences are rarer in patients who are well nourished.

The total duration of the disease, however, is shortened, in some instances, by months. That is, the long convalescences, formerly so common, have not been observed. The records with respect to convalescence are by no means complete, but a number of patients have reported back to the hospital from time to time. All of them have stated that they felt perfectly well and were physically able to follow their occupations (many of the patients were laborers) even within a short time after their discharge.

Condition of the Mouth.—While it is recognized that the condition of the mouth, including the tongue, in typhoid fever is dependent on the amount of attention bestowed on it by the nurse, it may be stated that the mental condition of patients who are well nourished is so good that they themselves keep their mouths clean. The only histories containing notes to the effect that the lips and tongue were in poor condition were found in the milk group.

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* Read before the Section on Practice of Medicine at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

1. For the bibliography of the papers by Drs. Shaffer and Du Bois, Mr. Gephart, and the author, see Arch. Int. Med., August, 1914, p. 168; May, 1915, pp. 882, 887.

Nausea and Vomiting.—Nausea and vomiting occurred in 19.3 per cent. of the high calory cases and in 22.6 per cent. of the milk cases. The difference is negligible. Nausea and vomiting were more frequent among the earlier high calory cases when the diet was limited to milk, cream, lactose, and eggs; these symptoms became less common as other articles of food were added to the diet. Nausea and vomiting did not always coexist in the same patient. Lactose at times caused vomiting without nausea. Most often nausea and vomiting followed attempts to increase the food too rapidly or when the food mixtures were too rich. Some patients vomited the high calory diet and milk indifferently. A few patients had persistent and uncontrollable vomiting due either to recent excesses in alcohol or to the disease per se.

Tympanites and Diarrhea.—Though often associated, these did not always occur together. Tympanites occurred in 17.6 per cent. of the high calory cases and in 31.5 per cent. of those on milk. Extreme grades of tympanites were rarely observed among the high calory cases. Diarrhea occurred in 16.2 per cent. of the high calory cases and in 48.6 per cent. of those on milk. Temporary diarrheas of one to several days' duration have been included in the percentage for the high calory cases but not in that for the milk cases.

For comparison, the statistics of the Hamburg (2,240), and Leipzig (1,875) cases, as given by Curschmann,[2] may be cited. Continuous diarrhea occurred in 36.1 per cent. of the cases in the Hamburg epidemic, temporary diarrhea in 29.7 per cent., making a total of 65.8 per cent. In the Leipzig cases, continuous diarrhea occurred in 25.6 per cent. and transient diarrhea in 37 per cent., with a total of 62.6 per cent. Normal stools occurred in 5.2 per cent. of the Hamburg cases and in 4.4 per cent. of the cases in Leipzig.

The practice followed in Bellevue Hospital of giving a daily enema to all typhoid patients has made it impossible to ascertain what proportion of patients would have had spontaneous daily movements of the bowels and what proportion were constipated. With respect to the characters of the stools themselves, those from the high calory cases were notable for their normal color and consistence. A large proportion of the stools of the milk cases contained undigested milk curds.

Tympanites and diarrhea were observed more frequently among the earlier high calory cases. After 1911, only nine of these patients suffered from continuous diarrhea. Many patients entering the hospital with profuse diarrhea developed normal stools in the course of several days under the influence of the high calory diet.

Gradually it was learned that, except in a few patients, tympanites and diarrhea are due to an excess in the diet of one or another of the foodstuffs. Tympanites most frequently results from an excess of lactose; diarrhea most often from an excess of cream. Occasionally, the opposite was true. In one instance, tympanites disappeared when eggs were discontinued. Patients who at first were unable to take the desired amount of food usually could be educated to do so by graduating the increase. In the last few years, it has been found possible to control tympanites and diarrhea, in practically all instances, by rearrangement of the diet. In rare cases, tympanites and diarrhea always followed the attempt to increase the food beyond 1,000 to 1,500 calories, in spite of frequent alteration of the proportions of protein, fat, and carbohydrate.

Reference may be made in this connection to Torrey's[3] study of the intestinal flora of some of the high calory cases of this series and of other cases on a milk diet. Torrey found that patients who were able to take large amounts of food without digestive disturbances possessed a flora dominated by the *Bacillus acidophilus,* and that patients with an initial putrefactive flora were capable of developing a favorable fermentative flora, with disappearance of tympanites or diarrhea, under the influence of the diet. Exceptionally, the putrefactive type of flora persisted in spite of alteration of the diet—these were the patients who could not be liberally nourished. The therapeutic application of these results was at once apparent and at my request Dr. Torrey prepared a pure culture of *Bacillus acidophilus* for administration to typhoid patients. The bacillus was used first for patients entering the hospital with tympanites and diarrhea in order to hasten the transformation of the flora; later it was given more or less as a routine measure. The results have been satisfactory.

Through the investigations of Torrey, and of Hull and Rettger,[4] it is now known that the beneficial influence of the high calory diet on the intestinal flora is due to its lactose content.

When tympanites and diarrhea occur in typhoid fever (except perhaps in the prodromal stage for which we possess no data), they are the result of an unfavorable flora, which, in nearly all instances, is in turn dependent on an unsuitable diet. Tympanites and diarrhea, therefore, are not due to the specific action of the typhoid bacillus and should not be considered as essential symptoms of the disease.

Nervous Symptoms.—Three and six-tenths per cent. of the high calory cases were described in the histories as stuporous, restless, or toxic, as compared with 10.81 per cent. of the milk cases; 7.65 per cent. of the high calory cases were delirious throughout the greater part of the active period of the disease, 13.5 per cent. of the cases were delirious for one to several nights. Some of the patients with prolonged delirium, though nominally high calory cases, took very little food. In some instances the delirium followed intestinal hemorrhage.

Thirty-eight and three-tenths per cent. of the milk patients had well-marked delirium (20.7 per cent. of them sank into the typhoid state) while 3.60 per cent. were mildly delirious.

Twenty-one of the high calory cases that entered the hospital in a delirious condition, or the typhoid state, gradually cleared as the food was increased. Occasionally patients taking large amounts of food became delirious for short periods. None of the high calory patients who received the desired quantity of food developed the typhoid state. In eight of the fatal cases with severe nervous symptoms, the patients took less food than they required, for the most part under 2,000 calories a day.

The practically complete absence of severe nervous symptoms in patients who were able to take sufficient food and the disappearance of these symptoms with improvement in the patient's nutrition, warrant the conclusion that severe nervous disturbances, including the typhoid state, occur in typhoid fever only when the patients are undernourished. In other words,

2. Curschmann in Nothnagel's Encyclopedia of Practical Medicine, volume on typhoid and typhus fevers.

3. Torrey: Jour. Infect. Dis., 1915, **15**, 72.

4. Hull and Rettger: Jour. Bacteriol., 1917, **2**, 47.

severe nervous disturbances are not due to the specific action of the typhoid bacillus, but rather to the action of the bacillus in the presence of partial starvation. The well known fact that the typhoid state is not peculiar to typhoid fever lends support to this view.

The foregoing conclusions should not be interpreted to mean that typhoid patients, even when well nourished, may not develop delirium. Some persons become delirious whenever the temperature reaches a certain height irrespective of the cause of the fever.

Body Weight.—Loss of weight in typhoid fever was formerly so constant that it was considered a characteristic phenomenon of the disease. While the records of the patients in the milk series contain no reference to weight (the method of weighing patients had not then been devised), it can scarcely be doubted that all of them lost more or less in weight and in general, the severer the fever, the greater was the loss.

A large number of the patients in the high calory group were frequently weighed. The majority of them lost some weight during the active period of the disease, usually only a few pounds. The emaciation which was so common among the milk cases did not occur if the patients took reasonably large amounts of food. In a few instances, there was a gain in weight, even at the height of the fever or during a relapse. In all cases, as the appetite improved and the quantity of food was increased, the lost weight was regained in the later stages of the fever or early in convalescence. In other words, loss of weight is not a symptom of typhoid fever, but an indication that the patient is receiving insufficient food.

Complications.—As stated above, the number of cases in this series is not sufficiently large for comparisons of the rarer complications in the two groups to possess much value. Yet in some instances the results are striking.

There were a total of 110 complications in eighty-one of the high calory cases and 144 complications in ninety-one of the milk cases.

Intestinal Hemorrhage.—This occurred in 9.45 per cent. of the high calory cases. The hemorrhage was moderate in 5.40 per cent. and severe in 4.05 per cent. of the cases.

Among the milk cases, moderate hemorrhage occurred in 5.40 per cent., severe hemorrhage in 9 per cent. making a total of 14.40 per cent.

The difference in the incidence of hemorrhage in the two groups is too small to possess much significance, yet closer analysis brings out an important difference in the mortality from hemorrhage.

Twenty-one of the high calory cases were complicated by hemorrhage. Two of the patients died; one from hemorrhage alone, one from hemorrhage, pneumonia and cholecystitis, giving a mortality from hemorrhage of 9.5 per cent.

Hemorrhage occurred in thirty-two of the milk cases. There were nine deaths; six from hemorrhage alone (18.7 per cent.), and three from hemorrhage with other complications (9.4 per cent). The total mortality from hemorrhage among the milk cases was 28.1 per cent.

The frequency of intestinal hemorrhage, according to Curschmann, varies from 4 to 6 per cent. The mortality among cases with hemorrhage varies from 20 to 44 per cent.

In both groups of the present series, therefore, the incidence of intestinal hemorrhage is greater than usual, but the mortality from hemorrhage appears to have been lowered by the high calory diet.

With respect to the individual patient, intestinal hemorrhage seems to cause but little, if any more disturbance when the patient is well nourished, than the loss of an equal amount of blood by a healthy man. Occasionally a patient became delirious after a hemorrhage. One patient recovered after the loss of two quarts (estimated) of blood.

Perforation.—This occurred in two of the high calory cases (0.9 per cent.), and in seven of the milk cases (3.15 per cent.). The average incidence of perforation is placed at from 2 to 3 per cent. One of the high calory patients with perforation died. Six of the milk patients with perforation died, namely, 85.7 per cent. Tentatively, the conclusion may be drawn that the high calory diet lessens the liability to perforation.

Recrudescences and Relapses.—Recrudescences occurred in 6.75 per cent. of the high calory cases and in 11.3 per cent. of those patients on a milk diet.

Relapses occurred in 18 per cent. of the high calory cases and in 14.9 per cent. of the milk cases.

From these figures it is probable that diet is without influence on the frequency of recrudescences and relapses. Prolonged recrudescences, however, are apparently less common and relapses are better borne by patients who are well nourished.

Mortality.—Death occurred in 8.10 per cent. of the high calory cases and in 17.6 per cent. of the milk cases. This does not, however, express fairly the reduction in the mortality rate among the high calory cases which includes all deaths (except three who died within a week of admission to hospital) irrespective of circumstances which may have determined the fatal issue. Seven of the eighteen fatal high calory patients were unable, for one reason or another, to take the amount of food they required; thus, one had been on a ten day debauch, one vomited practically everything which was given him, one had status lymphaticus, one had been in the hospital for many weeks with abscess of the prostate before developing typhoid. Another of the fatal cases developed diphtheria. If we deduct these eight cases from the total, there remain ten deaths which are justly chargeable to the high calory group. This gives a mortality rate of 4.50 per cent. as compared with 17.6 per cent. for the patients on the milk diet.

Clinical Picture.—The statistical evidence which I have cited conveys but an imperfect impression of the profound changes which the high calory diet brings about in the natural history of typhoid fever.

While there is, obviously, considerable variation in the course of the disease in different patients, the most striking change in the clinical picture is the practical absence of severe, and, in many cases, of all nervous phenomena. The patients lie in easy positions in bed, such as a healthy man assumes while resting. The severer cases may be somnolent, at intervals flighty, but they are easily aroused. When awake they are alert, their eyes are bright, their facial expressions are natural. The patients lose very little weight and a casual inspection of them gives no hint of the nature or severity of the illness. Many patients read the daily papers and magazines while still running high temperatures. At meal times they turn on their sides, often propping themselves on their elbows, and eat from well filled trays without assistance from the nurse.

If this picture is contrasted with that of the severely toxic, half starved patient, with hollow cheeks, listless expression, staring eyes, and restless, emaciated forms, it is difficult to believe that they portray the same disease.

Influence of High Calory Diet on Treatment.—The use of the high calory diet has greatly simplified the treatment of typhoid fever. The amount of "nursing" is reduced to a minimum. While the preparation of the food undoubtedly demands more time than the administration of a glass of milk every two hours, this additional attention is more than counterbalanced in other directions. The use of drugs has been almost eliminated.

Every patient receives a saline or soap-suds enema in the morning and, as a rule, the bowels require no further attention during the day. If tympanites or diarrhea should develop, it indicates that the diet is improperly arranged and relief is obtained through alteration in the proportions of the foodstuffs.

No attempt whatever is made to control the fever. High temperature is believed to be a potential danger only when patients take insufficient food. Antipyretic drugs are considered dangerous; hydrotherapy, unnecessary. A cleansing bath is given every morning and, if alcohol "sponges" make the patient more comfortable, he receives one or more a day. In my opinion, hydrotherapy owes whatever value it possesses to reduction in total metabolism and not, as has so often been stated, to stimulation of the nervous system. If the increase in total metabolism can be covered by food, the cold bath loses its purpose.

In the absence of delirium, patients do not require constant watching to prevent them from getting out of bed and perhaps out of the window. They are not incontinent of feces and urine, with the consequent frequent changes of the clothing and bed. The tendency to bed sores is thereby lessened.

Fewer patients require cardiac stimulants, though I frequently give strychnin toward the end of the fever, or during convalescence, to restore tone to the musculature of the heart and blood vessels.

SUMMARY

A comparative study of 222 cases of typhoid fever on the high calory diet and of an equal number of cases on a milk diet has brought out the fact that the natural history of the disease, as it has previously been known, is profoundly altered by the maintenance of an optimal state of nutrition. The range of temperature apparently is not affected, but the total duration of the disease is shortened, in some instances by months, through the shortening of convalescence. Certain symptoms which hitherto have been attributed to the specific action of the typhoid bacillus have been discovered to be due to faulty methods of treatment, in particular, to an inadequate or improperly balanced diet. Complications are rendered less formidable, and perhaps less frequent, by maintaining the patient in the best possible state of nutrition. Moreover, the mortality from the disease is reduced by from 50 to 75 per cent.

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ABSTRACT OF DISCUSSION

Dr. E. F. Du Bois, New York: It has been my privilege to be associated with Dr. Coleman for seven years, and I have been able to see almost all of the typhoid patients he has treated during this time. One cannot help being markedly impressed by the change in typhoid fever as brought about by the Coleman-Schaffer diet. The picture of the patient is changed completely; the typhoid state is seldom seen; extreme apathy is rare; patients require comparatively little attention. Baths do not seem to be necessary. Medication in typhoid fever seems to be almost a thing of the past. As to mortality, the statistics speak for themselves. The general clinical impression of all who have seen a large number of typhoid patients fed on this diet is that the patients are infinitely more comfortable. There is still room for discussion as to the exact number of calories needed by the typhoid patient. The actual number of calories produced by the patient's own body amounts to some 2,000 calories a day. The question is whether one should be satisfied in giving that amount, or should give more. If one wishes to keep the patient in nitrogen balance, one must give about 4,000 calories, but that requires special training on the part of the nurse. Good trained nurses can administer 3,000, but most nurses have difficulty in giving 2,000 calories. At least 3,000 should be given, if possible. Most of the poor results are found in patients who have not been able to take 1,500 calories a day.

I think every one here must have been struck by the contrast between the subjects of the last two papers; that is, diabetes and typhoid fever. In diabetes Dr. Allen and Dr. Joslin have shown the necessity of keeping the calories as low as possible; in typhoid fever Dr. Coleman and Dr. Schaffer have shown the necessity of keeping the calories as high as possible. In modern medicine it is necessary to know the amount of calories in a patient's diet.

Dr. Dudley Roberts, Brooklyn: About four years ago my interest in Dr. Coleman's work led to an examination of his patients in Bellevue Hospital. At that time I was struck with three things: (1) his patients did not look as if they had typhoid fever at all; (2) there was a slight fullness of the abdomen in practically all cases, and (3) there were some difficulties in carrying out the high caloric feeding in private or even hospital practice. Since that time we have had about 100 cases in the wards of the Brooklyn Hospital and these impressions have all been confirmed. When the patient is properly nourished, typhoid fever presents an entirely different picture from the classic one. I have about come to the conclusion that what we have known as typhoid fever is largely the picture of starvation. Slight fullness of the abdomen is usually present and need cause no anxiety. The difficulty of using the high caloric diet we have solved to our satisfaction by the use of food formulas of definite caloric value per given measure, and by insisting that the caloric intake of the patient be known from hour to hour through proper charting.

It is to be feared that Dr. Coleman's work will be damned by too faint praise. We are not dealing with a little more liberality, but with a definite attempt to supply the bodily needs of the patient. An uncorrected mortality of 5 per cent. in our series and no deaths in cases in which high caloric feeding was actually put in practice, make a striking contrast to previous mortality percentages. Fully as important is the amazingly rapid convalescence. This is a monumental work that Dr. Coleman has done, and the plan of treatment should become the generally accepted practice.

Dr. C. H. Breidenbach, Dayton: Much opposition prevails, and always will, to radical departures from long established practice. I want to supplement Dr. Coleman's work with a report of 137 patients with typhoid fever on high caloric diet.

If we take home Dr. Coleman's message, we will benefit by attendance on these sessions. Some forceful character must arouse us from our lethargy. Here is a preventable disease, exacting, in this country, a toll of 35,000 lives annually—an economic loss of thirty billions in ten years. We have sought too eagerly the spectacular, mysterious and unexplored.

Of our series, seventy-six cases were treated by the high calory diet method from the onset. The results in these cases were gratifying and convincing. The entire aspect of the disease was changed. Noteworthy facts were as follows: absence, or only the slightest suggestion, of the terrifying, distressing, exhausting delirium and the ghastly emaciation which constituted the typhoid picture of the past; 32 patients lost less than 5 per cent. in weight; 20 maintained normal weight;

24 gained from 3 to 5 per cent; 1 died of intestinal hemorrhage.

Sixty-one patients came under observation after the disease had made considerable progress. These patients responded promptly to high calory feeding, delirium began to subside, pulse improved, temperature declined; the benefits of feeding were manifest within forty-eight hours.

Our routine treatment of typhoid will not be regarded as ultrascientific; it is, however, pregnant with gratifying results, although dubbed the C. O. D. treatment—castor oil, opium, and diet. Castor oil every other day will prevent the distention complained of by Dr. Coleman, and is less likely to provoke hemorrhage and perforation than most of us fear. For delirium, opium to the point of narcotism if required to end the coma vigil, tremor, twitching, etc. Narcotism of short duration will restore reason, improve pulse and reduce temperature. One patient died manifesting perforation. Necropsy revealed a thrombosed superior mesenteric artery with necrosis of sections of the small intestine.

Our mortality of 2 per cent. could not be maintained on this or any other treatment, but it is significant. Our policy is, hands off! No meddlesome treatment, allowing temperatures to run wild; 107 F. is the peak; when this is reached (and it usually is in from three to five days) the hour of improvement has been marked. The next morning, remission will be startling and gratifying, adding weight to Vaughan's suggestion that "In acute infections, high temperatures are perhaps beneficent, in that they may favor the formation of antibodies."

These cases extended over the past three years. We are so well satisfied with results that, until we have a more comprehensive konwledge of the pathologic chemistry of this and other acute infections, we shall not starve our patients, interfere with temperatures, deny them refreshing sleep, or rob them of "Granny's" ever pleasant physic, castor oil.

DR. MAX EINHORN, New York: I rise to substantiate the great value of Dr. Coleman's work in typhoid fever. I had some experience in this line in the German hospital for quite a number of years. I was always in favor of feeding the patients quite well, but I was of the opinion that the diet should be a liquid one, and gave the patients milk and raw eggs; but later, when I became acquainted with Dr. Coleman's work, I started in with the same methods, and in the hospital all my patients were treated according to his methods, with excellent results. I do not want to say that symptoms, with somnolence in typhoid fever are all due to starvation, but I will say that in a patient who is well nourished these symptoms are reduced. A weak patient will become delirious from the toxin of fever, while the well nourished patient will have the same amount of toxins but, with a high diet will not show so many symptoms. While it is not starvation alone that develops these severe phenomena, the symptoms due to the toxins can be greatly reduced by sufficiently raising the standard of nutrition in the body. I think you will find in Leyden's book on dietotherapy that many years ago the problem was raised whether, in typhoid fever in which there is a great expenditure of heat, more so than in health (while a normal healthy person expends 2,400 calories a day, a typhoid fever patient will expend 3,000 to 4,000 calories), it was possible to give enough heat to the body so that the expenditure should be balanced. This was not definitely answered until Dr. Coleman took it up and showed that it was possible to replace the entire amount of calories in typhoid fever when there was a severe disease in the intestines and high fever. Even here the body can be supplied with adequate nutrition, and that is a great advance, for which we should congratulate Dr. Coleman.

DR. E. P. JOSLIN, Boston: Overfeeding during an infectious disease would seem to be an ideal method by which to produce diabetes. I have seen no such case during recent years, but I am sure Dr. Coleman has some information on this point. There is, as we all know, a strong feeling among many physicians that infectious diseases are closely connected with the etiology of diabetes.

DR. A. E. ROUSSEL, Philadelphia: I feel that I should offer some few points of criticism. I wish to report that I have treated over 260 consecutive cases of typhoid fever at the Howard Hospital; 213 of these patients were treated on the modified diet—neither the milk diet nor the Coleman diet. On forty-nine of them I tried the Coleman diet. It may be that I was not sufficiently enthusiastic in carrying out the Coleman diet in these cases. The number of intestinal hemorrhages was large in the cases on full diet; the abdominal distention was more marked, and diarrhea was more universally present. Now, personally, as a teacher, I believe that probably the truth lies between these two extremes. But no matter what the diet today, the question of leaving temperatures of 107 alone is absurd and dangerous in the extreme. I would not care to treat that way. I repeat the fact that under the modified diet my mortality was 4 and a fraction of 1 per cent.; my mortality on the Coleman diet was over 8 per cent. It is possible that I may not have applied it as well as Dr. Coleman, but it is not difficult to carry out, and I followed his directions carefully. I want to say that we should not be carried away by too much enthusiasm. The intensity of typhoid fever is not as great as it was formerly, with a mortality of about 18 per cent. I think that hydrotherapy, which is bound to stay, has done much to modify its virulence. It appears to me that the cases that I see in consultation in the country and smaller towns are of a more severe type than those in the city. For example, I have knowledge of some cases that originated at a sea shore hotel with a mortality of 100 per cent. This is a degree of virulence that seems to be beyond any form of treatment. *In medio tutissimus ibis.* I think we should not go to extremes one way or the other.

DR. H. A. CHRISTIAN, Boston: Dr. Roussel has touched on one important point in the consideration of statistics in acute infectious diseases, and that is the importance of recognizing that from year to year there is a variation in the curve of mortality. Therefore we must not compare the results of treatment of typhoids or pneumonias of one year with those of another year without making allowance for that variation. I did not catch in Dr. Coleman's paper whether the statistics of the patients on the high calory and low calory diets represent patients in the same or different years. If they represent patients in different years, allowance must be made for variations in the severity of the disease. I think it is important to make that clear. Alternate cases in a given hospital treated, one case in one way and another case in another way, will give more valuable data than taking cases in one year to compare with those in another.

Typhoid fever has changed, as I have seen it in the last five to seven years. Typhoid that is described in the textbooks, typhoid that our students read about, cannot be illustrated at present by the typhoid patients we have in the wards. We have to say to our students that this will impress you of the typhoid you have read about in the books because it is so different. Whether that is due to the feeble virulence of the organism, or to our treatment, is an important thing to know. I have carried out the Coleman treatment in my cases. The results have been satisfactory, but being skeptical, I wonder how much is due to the Providence that determines the pathogenicity of the organism, and how much to our treatment of the disease.

DR. WARREN COLEMAN, New York: In regard to the question of Dr. Joslin, of diabetes and typhoid, in practically the whole series of cases, sugar was present in the urine of only one patient. Of course the urine was not examined every day in all the high calory cases, but I think diabetes could not have been present without our having discovered it. In the case I am speaking of, it was glycosuria; as far as is known, none of the patients developed diabetes during convalescence. The important fact with regard to the patient who had glycosuria was that his sugar tolerance increased at the same time that we increased the carbohydrate intake. That was one of the cases we studied very carefully. The patient was put on the Benedict respiration machine every other day for a long period, so that we knew exactly what was going on with respect to his metabolism, and the sugar tolerance increased in spite of the fact that the carbohydrate intake was raised. One point with regard to Dr. Roussel's remarks is that the more experience I have had, the more important it appears to individualize the feeding. All patients cannot be fed by rule of thumb. It is an individual question entirely. Also, if the patient's intestinal flora is of the putrefactive type at

the beginning, it will take longer to raise his tolerance for the feeding than if he had a favorable fermentative flora. In some cases one can greatly increase the milk sugar and in others not. It is necessary to find out the kind of food the patient requires. With relation to the question of years of the cases in the two groups, raised by Dr. Christian, that is in the paper, I omitted it because I did not wish to take up too much time. As far as possible, the cases were selected in corresponding years. I think the fact that the cases cover a period of ten years to some extent counterbalances the defects in this respect.

THE INFLUENCE OF LABOR ON THE BRAIN DEVELOPMENT OF THE CHILD*

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The possession of a healthy mind in a healthy body is the first and indispensable condition for survival in the struggle for existence. In view of the far-reaching and disastrous results of mental enfeeblement in the individual, the home and the community, it becomes the duty of the physician to investigate all possible sources of intellectual deficiency and to eliminate all etiologic factors amenable to control. The idiot by heredity, the victim of congenital variation of germ plasm or of embryonic insufficiency of internal secretions, whose brain anomaly dates back to early intra-uterine life, is beyond our help except to the extent that we may benefit him by glandular therapy and educational methods.

Conditions are altogether different in the case of a healthy, well developed child that has traveled safely through the months of fetal evolution and reached the journey's end only to be wrecked during the process of his entry into the world.

Preventable traumatism to the skull and its contents is the subject to be considered in this paper. The rescue of even a single human being from feeblemindedness incurred through injury at birth is such an important matter that it has occupied my mind for years, ever since in my student days I witnessed an almost incredibly long protracted labor, culminating at last in the spontaneous delivery of a living child. While practically free from external blemishes, it was almost a foregone conclusion that this infantile skull harbored a bruised and congested brain, with hemorrhagic areas and extensive destruction of nerve cells which would in turn lead to arrested brain development and feeblemindedness.

Instrumental delivery, more particularly by the obstetric forceps, has often been accused of being the cause of birth traumatism, and has undoubtedly caused serious mutilations in the hands of the unskilled; but its action can never be so prolonged or profound as the molding of the soft cranial bones in very narrow or otherwise obstructed pelvic passages.

INJURY TO BRAIN IN DIFFICULT LABOR

Unduly prolonged or otherwise abnormal deliveries may damage the child's brain through three mechanisms: (1) direct contusion of the brain substance; (2) local congestion and rupture of intracranial vessels by the overriding parietal bones, and (3) general congestion of the venous system caused by an obstruction of the fetal circulation and resulting in capillary rather than in diffuse meningeal hemorrhages.

Prolonged general compression of the child's skull in the birth-passages in difficult unassisted labors is one of the causes of displacement of the cranial bones and a resulting circulatory disturbance in the venous sinuses, according to Kundrat.[1] In a paper on Wormian bones in fontanels and their effect on childbirth, Dr. Grace Peckham Murray[2] called attention to the possibility of obstetric damage to the infantile cranial contents during the second stage of labor as the time of greatest pressure. Based on personal experience in three lengthy labors with three stillbirths, she points out the detrimental influence on the child in consequence of the unduly prolonged labor. ("Instruments were not used in either instance, as there was a constant expectation that the labors would terminate naturally.")

If the damage to the brain and nerve centers may be sufficient to destroy life, as in the three cases reported by this observer, it is not unreasonable to assume that other infants may survive with irreparably damaged brains. The question also arises whether these Wormian bones in fontanels, especially in the posterior fontanel, by preventing the overlapping of the sutures and normal molding of the child's head, may not contribute their share to the exposure of well developed infants to the danger of idiocy and imbecility through the prolonged compression of the skull in the birth passages.

It is a pity that surviving children born after unaided but unduly prolonged labors have never been systematically studied in their primary school work and later mental development. Equally regrettable is the lack of reliable information regarding the birth conditions of the children in institutions for the feebleminded. As a rule, there is at best a bald statement to the effect that the birth was natural, without comments on the duration of the labor, or that it was terminated by instrumental delivery, which is often held responsible for the feeblemindedness. In this manner a prejudice unwarranted by the actual facts is created against the obstetric forceps. Goddard[3] states, however, that "since many normal children are delivered by the use of instruments with more or less temporary deformity to the head but without any effect on the mentality, it is unreasonable to conclude in those cases where there is both hereditary feeblemindedness and a history of instrumental delivery that the latter is the cause of the mental deficiency."

Obstetric clinics, at least so far as I have been able to ascertain, keep no notes on this subject, and I have therefore endeavored to collect some data from institutions for feebleminded children. I am well aware of the imperfections of these brief statistics, and I offer my figures chiefly in the hope that they may serve to stimulate a needed interest and invite a better study of the subject both in obstetric clinics and in homes for the feebleminded.

A study of causes of mental defect, active at time of birth in 5,000 cases (from the Pennsylvania Training School for Feeble-Minded Children at Elwyn, Pa.), shows the following results: instrumental deliv-

* Read before the joint meeting of the Section on Obstetrics, Gynecology and Abdominal Surgery and the Section on Nervous and Mental Diseases at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

1. Kundrat: Ueber die intermeningealen Blutungen Neugeborener, Wien. klin. Wchnschr., 1890, **3**, 887.
2. Peckham, G.: Wormian Bones in Fontanelles and Their Effect in Childbirth, Med. Rec., New York, 1888, **33**, 412.
3. Goddard: Feeblemindedness, Its Causes and Consequences, New York, 1914, 447.

ery, 134 cases (2.68 per cent.), and difficult and prolonged labor, but without instruments, seventy-five cases (1.50 per cent.).

In a total of 562 cases recorded at the training school for mentally abnormal children at Vineland, N. J., the history of an unusually difficult or extremely prolonged labor (up to three days) appears 125 times. Special mention is sometimes made of a very large infantile head or one detained for an abnormally long time in the birth passages. Careful investigation of the records results in the discovery that in fifty-four of these protracted births no instruments were employed, which is equivalent to saying that no artificial assistance of any kind was rendered. A systematic review of the clinical material in the asylums on Randall's Island was undertaken in the expectation of securing valuable data for the establishment of the claims made in this paper. Unfortunately, incompletely kept records yielded only meager results.

It appears that on Randall's Island, for example, the first attempts at record-keeping date back less than two years, namely, to August, 1915. Altogether 1,800 histories were investigated, but comparatively few furnished any information on this point; 228 cases recorded since August, 1915, contain no account of the conditions at birth; forty-one case records state that pregnancy and birth were normal, the mental disturbance developing in later childhood as the result of traumatism or infectious disease. Of 308 records which contained statements as to the conditions at the time of birth, eighty-one showed these conditions to have been unfavorable in a variety of ways. Unduly prolonged and difficult noninstrumental deliveries were noted in thirty-four instances.

Some cases taken at random are as follows: Labor occurred at term in a primipara, aged 22 years, and lasted three days; the child was born in convulsions and grew up to a life of feeblemindedness. Another inmate, a low grade moron idiot, was born after an unassisted labor lasting forty-eight hours. Another child classed as an imbecile is stated as having been born after a very difficult labor in which neither instruments nor chloroform were used. Three cranial operations were performed without benefit and the record adds that they probably did harm.

It is evident that these meager statistics hardly permit one to draw any conclusions. They certainly show that in an appreciable number of cases long delivery did play a part in the birth of the future defective. I feel justified in saying that in more carefully kept records we might find a surprisingly large percentage of feeblemindedness due to this cause.

PROTRACTED LABOR AND THE OBSTETRIC FORCEPS

Dührssen and his pupil Küntzel,[4] the only obstetricians who ever took up this subject, claim that an unduly prolonged and difficult birth exerts a far more injurious influence on the child's brain than the skilled application of forceps. Among 450 idiot children, four mental defectives (0.9 per cent.), were found whose idiocy was attributed to instrumental traumatism as compared to a much greater number of difficult unassisted deliveries with twenty-three cases of idiocy. Furthermore, in Küntzel's[4] compilation there are twenty difficult births with artificial aid, that is, 4.5 per cent. as compared to 0.9 per cent. of idiots brought into the world by means of instruments. Evidently obstetric operations cannot in a general way be accused as causative factors in the production of idiocy, and the application of forceps is decidedly preferable to protracted parturition with its serious danger to the mental integrity of the child.

Whereas the obstetric literature is remarkably poor in material dealing with this important subject, a systematic review of the neurologic literature reveals a startling array of illustrative cases which in the aggregate bear eloquent witness to the necessity of bringing the truth to the attention of obstetricians. Neurologists who have investigated the relation between birth disturbances and epilepsy, for example, are induced to believe that traumatism during the act of parturition predisposes the child's brain to the development of epileptic processes, and that birth disturbances must be held responsible as preparatory causes of epilepsy in a number of the cases.

In the Bicêtre Institute in Paris, the parents of the idiotic, epileptic, and paralytic inmates are carefully interrogated in all respects with a possible bearing on the condition of the child including all the details of delivery, especially as to its length and difficulty. The example could be advantageously followed by our own hospitals. Tissier's[5] statistics of mentally abnormal children in this institution comprise altogether 900 cases, in 550 of which the patients were living at the time of the report; the remaining 350 cases concerned patients who had died in the same hospital since 1883. Of seventy-six idiotic children, eighteen were born asphyxiated after difficult labors, and eighteen were born after difficult labors, but not asphyxiated.

Shuttleworth and Potts,[6] on the basis of experience with 2,380 mentally deficient children observed at the Royal Albert and Darenth Asylum, say:

> Among causes acting at birth, that to which undoubtedly most importance attaches is prolonged parturition. It has been alleged that the use of forceps is accountable for a considerable amount of cerebral injury and consequent mental impairment. So far from this being the case it would appear from the statistics [of Shuttleworth and Fletcher Beach] that protracted pressure without instrumental interference is a much more potent cause both of mental and nervous defect. It is unquestionable that the asphyxia neonatorum, so often due to protracted unassisted labor, is in some cases followed by birth palsies and enfeeblement more or less severe of the intellectual powers. It is probably accountable for not a few of the milder types of mental feebleness.

The words of Currier[7] must be quoted in this connection:

> A large head in a small pelvis or even a normal head in a nearly normal pelvis may be retained so long that the brain will be dangerously compressed. This is not an infrequent occurrence when the uterine contractions are indefinitely suspended in connection with the uterine inertia. Such cases were far more frequent in the past than now, the labor being allowed to continue for days rather than interfere with what were supposed to be the legitimate efforts of nature. A skull which has been compressed by such prolonged incarceration may resume its proper contour after a longer or briefer period of time and give no outward evidence of injury, but it is quite probable that if the sensitive brain has undergone compression to a considerable degree for many hours, the result will be disastrous to the child, imbecility or idiocy being the consequence. Of course the effects of this injury may not

4. **Küntzel: Ueber den Einfluss geburtshülflicher Operationen** auf die geistige Entwicklung der Kinder, Inaug. Diss., Berlin, 1891.

5. Tissier, P.: De l'influence de l'accouchement anormal sur le développement des troubles cérébraux de l'enfant, Thèse de Paris, 1899.

6. Shuttleworth, S. E., and Potts, W. A.: Mentally Deficient Children, Philadelphia, 1910, 88.

7. Currier, A. F.: Injuries of the Head in the New-Born, Med. News, London, 1901, **79**, 161.

be apparent for many months or even years. In cases of this character the effects of hemorrhage may also be disastrous, the blood escaping through an opening in the scalp or forming a tumor under the scalp or the pericranium, or effusing and coagulating within the membranes or within the substance of the brain itself. It is largely to the credit of modern obstetrics that these accidents have become less frequent, for by the advocacy of the timely use and proper application of the forceps or other suitable instrumental procedures, it has indicated the way to anticipate and obviate them while it has at the same time brought relief to the troublesome injuries to the maternal soft parts which were so common when the labor remained unassisted for several days.

To let nature take its own course is an especially risky procedure in the case of the many children with a faulty heredity. Any traumatism of the head is here especially significant, for a brain injury which might leave no trace behind it in normal children is extremely apt to induce permanent disturbances followed by idiocy or the milder degrees of mental enfeeblement (Wulff[8]).

Family reports collected by Volland[9] plainly show the occasional injurious influence of birth traumatism, for in the same family the normally born children may remain well, whereas those born after a difficult labor become epileptic.

Whereas the value attached by certain neurologists and psychiatrists to protracted labor and infantile asphyxia as etiologic factors in later manifestations of mental enfeeblement has been greatly exaggerated according to some writers (Hannes[10]), others on the basis of their findings emphasize that birth traumatism possesses an undeniable importance in this respect, and that there are cases of idiocy in which no other etiologic factor is left but an abnormal delivery (Klotz[11]). Still other writers concede the possibility of irreparable damage to the brain through birth traumatism, without regarding this danger as at all probable.

The reason the sequelae of cranial compression are recovered from in some cases but prove irreparable in others cannot be satisfactorily given at the present state of our knowledge. Strohmeyer[12] comments on the very frequent statements concerning prolonged parturition in the anamnesis of feebleminded children.

Klotz[11] contributes a small but unobjectionable list of 144 cases in boys and girls, admitted in the course of five years to the Schwerin institute for abnormal children. "Abnormal birth" was stated in nineteen cases, including eight protracted labors and eight forceps deliveries. Three children were born asphyxiated. After strict exclusion of all cases with faulty heredity or other complicating or predisposing etiologic factors, there remained five protracted labors as alone responsible for two idiotic and three imbecile children.

Jelliffe and Peterson[13] point out that parturitional factors, including meningeal hemorrhage from prolonged labor, are active in about 18 per cent. of the cases, and it is emphasized that forceps traumatism is less injurious to the infant than tedious labor.

Ziehen[14] regards protracted labor as an important etiologic factor in the production of cortical aphasia and retrogressive changes of the brain, as well as of certain cases of nuclear anomalies of development.

Difficult and protracted deliveries are held responsible as the cause of cerebral palsies, in many cases, by Ibrahim,[15] who says that although the application of forceps may have a similar effect, skilled instrumental assistance undoubtedly prevents rather than produces the hemorrhage in most of the cases, the circumstances which have led to the application of the forceps being usually responsible for the origin of the trouble.

Peterson and Fisher[16] place prolonged labor first in importance in the etiology of cases of infantile spastic hemiplegia occurring at birth or infancy. They say that a large proportion of children who require resuscitation become imbeciles, meningeal and capillary hemorrhage being produced by pressure in the maternal passages. They say:

> It is probable from careful investigation that the use of forceps has little to do with causing these cases; but, on the contrary, its delayed employment or nonuse more often results in danger to the child.

Sachs and Peterson,[17] writing on cerebral palsies in early life based on an analysis of 140 cases, point out the moral to be drawn from their table of causes in the congenital cases, namely, that the forceps should be applied if necessary; or delivery hastened by other means if protracted labor can be averted:

> A child's brain and skull have a wonderful power of resistance; but do not credit them with greater virtue in this respect than they really possess. The mother's life is by far the more important, but it is well to reflect that, other things being equal, she prefers a child that is neither paralyzed nor idiotic.

All degrees of mental enfeeblement, from slight imbecility to extreme idiocy, may occur in association with the cerebral palsies of young children which are not infrequently the result of birth traumatism. Sachs[18] concludes from the especially common occurence of idiocy in the paraplegias (60 per cent.) as compared to hemiplegia (13 per cent.) that this congenital spastic paraplegia must be of cerebral rather than of spinal origin, and this view has been amply confirmed by later investigations. He believes that many a paralyzed and idiotic child would lead a normal existence if the child had been properly considered at the time of birth.

To delay the application of the forceps, as is the rule of many obstetricians, until the fetal heart sounds become weak or inaudible, means that irreparable damage has often already been done to the infant's brain. In the interest of the child, unduly protracted births should be terminated by judicious intervention.

One of the illustrative cases under Sachs' observation concerned a boy, aged 3½ years, the second born of a pair of twins after an extraordinarily protracted

8. Wulff: Die geistigen Entwicklungshemmungen durch Schädigung des Kopfes vor, während, und gleich nach der Geburt, Allg. Ztschr. f. Psychiat., 1893, **49**, 133.

9. Volland: Geburtsstörungen und Epilepsie, Allg. Ztschr. f. Psychiat., 1906, **63**, 725.

10. Hannes, W.: Zur Frage der Beziehungen zwischen asphyktischer und schwerer Geburt und nachhaltigen psychischen und nervösen Störungen, Ztschr. f. Geburtsh. u. Gynäk., 1911, **68**, 689.

11. Klotz, M.: Die aetiologische Bedeutung des Geburtstraumas für die geistige und koerperliche Entwicklung, Ztschr. f. d. ges. Neurol. u. Psychiat., 1914, **8**, 1.

12. Strohmeyer, W.: Vorlesungen über die Psychopathologie des Kindesalters, Tubingen, 1910, 187.

13. Jelliffe, S. E., and Peterson: Idiocy, Imbecility and Feeblemindedness, Peterson and Haines, Textbook of Legal Medicine and Toxicology, 1903, **1**, 668.

14. Ziehen, T., in Bruns-Cramer-Ziehen: Handbuch der Nervenkrankheiten im Kindesalter, 1912.

15. Ibrahim: Curschmann's Lehrbuch der Nervenkrankheiten, p. 657.

16. Peterson, F., and Fisher, E. D.: Cranial Measurements in Twenty Cases of Infantile Cerebral Hemiplegia, New York Med. Jour., 1889, **49**, 365.

17. Sachs, B., and Peterson: Cerebral Palsies in Early Life, Based upon an Analysis of 140 Cases, Jour. Nerv. and Ment. Dis., 1890, **15**, 295.

18. Sachs, B.: Contributions to the Pathology of Infantile Cerebral Palsies, New York Med. Jour., 1891, **53**, 503; Die Hirnlähmungen der Kinder, Volkmann's Samml. klin. Vortr., Nos. 46-47 (Innere Medicin No. 16), 1892, 435.

labor. Aside from spastic paraplegia the child presented an idiotic appearance and cried incessantly. Speech had never developed; the skull was small and unsymmetrical.

Another little boy with congenital spastic paraplegia came under observation when he was 1 year of age. He was born asphyxiated after the hard, dry labor (forty-eight hours) of a primipara. The mental condition so far as could be judged was deficient but not absolutely idiotic. The child did not survive the first year, and the necropsy showed absolute adherence of the pia over both hemispheres and a marked symmetrical atrophy of the frontal halves of both hemispheres. The anatomic diagnosis was clearly that of a chronic meningo-encephalitis. We cannot err in attributing this meningo-encephalitis to a very widespread effusion of the blood between the pia and the cortex at the time of birth. Protracted labor and the marked asphyxia are the clinical conditions which corroborate that view.

The statistics of Fletcher Beach[19] give a ratio of 27.28 per cent. to prolonged parturition as a factor in the production of idiocy. On comparing these figures with Shuttleworth's admittedly imperfect statistics on this point, we obtain a proportion of 17.5 per cent. Of these the much larger number (14.24 per cent.) are attributed to protracted pressure without instrumental interference. Only 3.31 per cent. are attributed to forceps delivery. In comparatively few of the latter, however, were injuries noted due to the use of forceps, and there is no doubt that prolonged parturition is more detrimental than delivery by forceps.

In the experience of Fletcher Beach in the Darenth Asylum for imbecile children, the use of forceps had much less influence than their disuse in the production of idiocy and imbecility, as he points out in another article. Students sent by some of the lecturers on psychologic medicine were taught by him that prolonged and difficult labor is a potent cause of imbecility and that in such conditions it is better to put on the forceps than to run the risk of prolonged compression of the head, resulting in asphyxia, paralysis and other evils. The use of forceps skilfully applied is preferable to prolonged and difficult labor. On careful inquiry it was found that of 810 cases of idiocy in which histories could be obtained, only thirty-four, or 4.3 per cent., were charged to the application of the obstetric forceps, whereas 216 cases, or 26.6 per cent., were apparently due to prolonged and difficult labor. The majority of these infants when born were not only asphyxiated but also in a helpless condition, some having lost the use of their legs, and others becoming subject to convulsions; moreover, the head was often crushed, elongated, discolored and deformed. The table of causes of idiocy and imbecility in 2,380 cases abstracted from the Royal Albert Asylum and Darenth Asylum case books include the records of prolonged parturition, that is, protracted pressure in 339 cases not including the instrumental deliveries.

According to König's[20] investigations of the etiology of simple idiocy based on 260 cases, difficult birth with or without asphyxia of the child was noted in thirty-nine cases (5 per cent.), thirty-four of which were spontaneous labors without instrumental assistance. In seventeen of these cases, difficult labor and asphyxia could be assumed with a fair degree of certainty as the true and only etiologic factor, and it is suggestive that in not a single instance could difficult labor be excluded as a cooperative factor.

In France, Wallich[21] was enabled to trace the meningeal lesions of new-born children to traumatisms in twenty of thirty-two cases in which examination was made. Babonneix[22] repeatedly observed intellectual disturbances in the form of backwardness, imbecility and idiocy as the result of birth traumatism both in instrumental and in natural but unduly prolonged labors. He emphasizes the necessity of childbirth taking place under as easy and nearly normal conditions as possible, especially in the interest of the child's intelligence.

In this country, Reichard[23] emphasized nearly twenty years ago that the infantile cerebral membranes and tissues are in far greater danger from prolonged and unassisted labor than from any pressure which may be applied to the head by the proper use of the forceps. He maintains that vastly more damage is done to the structures involved in mental and nervous processes by injudicious and incapable delay than by the timely and proper use of the forceps.

Some writers, as Sander[24] and Langdon Down,[25] go so far as to deny altogether an injurious influence of the obstetric forceps when skilfully handled. In contradistinction to the small number of idiots born in countless forceps deliveries, an incomparably larger number of children actually owe their rescue from the dreary fate of the idiot precisely to the judicious application of the obstetric forceps.

Granting that the most salient causative factors in the production of idiocy are prenatal influences exerted on the fertilized ovum and the embryo, it is apparent that we are powerless to modify the processes of ontogenesis, and it therefore becomes of double importance to preserve intact the brain which has been normally developed to the end of gestation.

Naturally primogeniture plays a part in the etiology of congenital and early acquired mental deficiency, since the labor of a primipara is often slow and difficult, thereby favoring prolonged compression of the head in the birth passages, and asphyxia.

Even in the writings of Vogt[26] who protests against exaggerated valuation of injurious parturitional factors as causes of idiocy, the admission is found that in seven of 471 cases of congenital and early acquired cerebral deficiency with the statement of protracted labor, the difficult birth of the child proved to be the only etiologic factor to which its condition could be charged.

We may allow some compression of the infant's head in the interest of speedy extraction, for the cranium of the new-born is so elastic that this small amount of pressure can be borne for a short while without danger of permanent damage from expert application of the blades.

Violent manipulation of obstetric instruments may lay the foundation for mental deficiency of the child,

19. Beach, Fletcher: Is Instrumental Delivery a Cause of Idiocy? Lancet, London, 1889, **1**, 97. Tuke, Hack: Article on Idiocy, Dictionary of Psychological Medicine, Philadelphia, 1892.

20. König, W.: Die Aetiologie der einfachen Idiotie verglichen mit den cerebralen Kinderlähmungen, Allg. Ztschr. f. Psychiat., 1904, **61**, 133.

21. Wallich, N.: Recherches d'anatomie pathologique chez le nouveau né, Ann. de gynéc. et d'obst., 1898, **49**, 201.

22. Babonneix, L.: Les traumatismes obstétricaux dans l'étiologie des encephalopathies infantiles, Gaz. d. hôp., 1909, **82**, 1601.

23. Reichard, V. M.: The Obstetrical Forceps as a Cause of Mental and Nervous Disease; A Protest, Med. News, 1898, **73**, 199.

24. Sander, in Eulenburg: Real-Encyclopaedie der gesammten Heilkunde, **6** and **7**.

25. Down, Langdon: On Some of the Mental Affections of Childhood and of Youth, Lettsomian Lectures, London, 1887; Wood's Medical and Surgical Monographs, New York, 1891, 307.

26. Vogt-Weygandt: Handbuch der Erforschung und Fürsorge des jugendlichen Schwachsinns, **1**, 1911.

just as prolonged compression between the unyielding walls of a narrow pelvis; but the fact is sometimes overlooked that even in children born after a natural and normal labor the head is necessarily molded (and probably suffers the limit of its tolerance) as a result of its journey through the bony canals.

Cranial compression in a contracted pelvis is enumerated among the causes of mental deficiency by Krafft-Ebing,[27] Samuel and other authorities. The reasons for more active obstetric intervention in tedious labors were investigated by Hofmeier[28] in the Würzburg clinic on the basis of a material of 168 children who died during or in consequence of the birth process. In ninety-seven cases (58 per cent.) the deaths were referable to complications which were in no way related to the bony pelvis, whereas in seventy-one cases (42 per cent.) the child's death was directly due to a contracted pelvis either alone or in combination with other complications. A moderate increase of forceps deliveries is advocated by him in the interest of the child.

The advance in the art of the obstetrician is strikingly illustrated by twentieth century studies of the internal secretions and the addition of pituitary solution to the means of artificial assistance of childbirth at our disposal. At present it is not only the proper handling of the forceps on which the up-to-date accoucheur relies for the abbreviation of tedious labor and the protection of the infantile cranium. The use of pituitary solution in small doses, that is, from 2 to 3 minims, as an adjuvant in normal labor at term, which I have advocated on the basis of personal experience in a series of cases, represents the latest achievement in practical obstetrics. It is an established fact that the action of this powerful glandular extract will often shorten by many hours the time during which the brain of the child would otherwise be exposed to a dangerous compression between the rigid bony walls of the birth passages. Less than ever, since the introduction of pituitary solution, can the indolence be condoned which formerly permitted a difficult labor to drag on for days before the necessity for interference was finally admitted. Pituitary solution in small physiologic amounts as administered to our patients is probably destined to save many a well developed infant from the dreary fate of idiocy or feeblemindedness.

In the laudable endeavors recently inaugurated for the obtaining of "better babies," the enthusiastic workers along eugenic lines can no longer afford to overlook the threatened deterioration in the quality of the offspring through traumatism at birth.[29]

27. Krafft-Ebing: Lehrbuch der Psychiatrie Ed. 6, 1897, p. 607.

28. Hofmeier, M.: Ueber die Berechtigung einer aktiveren Richtung in der geburtshilflichen Therapie, Ztschr. f. Geburtsh. u. Gynäk., 1907, **59**, 205; Centralbl. f. Gynäk., 1907, **31**, 774.

29. In addition to the references already given, the following will be found of interest:

Ballantyne, J. W.: The Head of the Infant at Birth, Edinburgh Med. Jour., 1890, **36**, 97.

Barr, Martin W.: Mental Defectives, Their History, Treatment and Training, Philadelphia, 1904, 115.

Bochroch, M. H.: Birth Palsies, Med. News, London, 1903, **32**, 1144; New York Med. Jour., 1903, **78**, 546.

Gans, H.: Früh- und Spätresultate der Zangenoperation für Mutter und Kind, Monatschr. f. Geburtsh. u. Gynäk., 1908, **29**, 430.

Koelle: Ursachen des Schwachsinns, IV Schweizer Konferenz für das Idioten Wesen, 1903.

Kowitz, H. L.: Intrakranielle Blutungen und Pachymeningitis haemorrhagica chronica interna bei Neugeborenen und Säuglingen, Virchows Arch. f. path. Anat., 1914, **215**, 233.

Putnam, J. W.: Prolonged and Tedious Labors and Forceps Deliveries Compared as Causes of Epilepsy, Idiocy and Cerebral Diplegias, Buffalo Med. Jour., 1909, **64**, 353.

Ryerson, E. W.: Brain Injuries at Birth, Internat. Clin., 1915, Series 25, **2**, 106.

Vogt, H.: Epilepsie und Schwachsinnszustände im Kindesalter, Arch. f. Kinderh., 1908, **48**, 321.

CONCLUSIONS

1. Prolonged, unassisted labor is responsible for much avoidable, harmful compression of the infant's skull in the birth passages during the period of labor.

2. The damage sustained by the child's brain and meninges often affects intellectual growth, resulting in the production of all degrees of mental impairment, from feeblemindedness and imbecility to absolute idiocy.

3. The connection between obstetric traumatism and nervous disease in the widest sense of the term has not received sufficient consideration in the past, on account of the nonexistence of a systematic cooperation between maternity hospitals and institutions for feebleminded children.

4. In the interest of more efficient control of preventable idiocy, a better cooperation in the form of more detailed records of the conditions during labor and of the subsequent mental development of the children is urged.

5. A better understanding between obstetricians and neurologists will help to diminish the number of imbeciles and idiots.

6. The obstetric forceps, correctly applied, are a beneficent weapon against the abnormally prolonged passage of the child's head through the pelvic canal.

7. Pituitary solution in small doses (from 2 to 3 minims) hastens the course of labor in many cases, rendering the application of the forceps unnecessary and safeguarding the contents of the infant's skull.

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ABSTRACT OF DISCUSSION

DR. FREDERICK PETERSON, New York: Twenty-five years ago Dr. Sachs and I made a number of studies of the infantile cerebral palsies, finding that the chief cause of palsies occurring during parturition was tedious labor with resulting intracranial hemorrhages, and laid down the dictum at the time that the application of the forceps in tedious labor did less injury than the long continued compression.

While these cases are often catalogued wholly under the heading of cerebral palsies, there are associated conditions such as epilepsy in 45 per cent. of cerebral palsies, and even more common are the three degrees of defective mind, namely, feeblemindedness, imbecility and idiocy.

There have been studies of hemorrhages in the central nervous system in stillborn children, such as that of 130 cases by H. Spencer, showing the relative distribution of hemorrhage as follows: 4 thrombosis of longitudinal sinus; 1 intracerbral; 7 lateral ventricles; 6 limited to the base of the brain; 30 spinal canal and cord; 53 from pia and arachnoid. Of these last, 29 are bilateral, 10 over the right hemisphere only and 10 over the left hemisphere. Of course the size and depth of the clot must determine the symptoms. For instance, in one case without paralysis there was congenital epilepsy and hemianopsia; in two or three, hemianopsia associated with hemiplegia and feeblemindedness. There is every reason to believe, as I have often said, that there are many cases of various degrees of mental impairment without either epilepsy or paralysis due to the same cause—intracranial hemorrhage due to tedious labor.

It has been said that about 18 per cent. of all cases of congenital idiocy are due to parturitional causes, chiefly tedious labor, though these statistics may be revised with further study of etiology.

DR. E. B. CRAGIN, New York: The importance of this subject can hardly be estimated. It is said that the general physician has the advantage over the obstetrician or surgeon. The general physician can put his mistakes underground. The obstetrician sees them walk about, and often they go to other members of the profession. Many an obstetrician mourns to see a child whom he has brought into the world

walking along the street showing mental impairment as the result of the delivery. What can be done during pregnancy to prevent the intracranial hemorrhage and consequent mental impairment? We have to recognize that a breech presentation is followed by more of a tendency to cerebral hemorrhage than a vertex. This means that the obstetrician must carefully study during the pregnancy the presentation of the child, and, if possible, correct it before labor. This also means that we should examine our pregnant patients through the abdomen more frequently than many do, and the accurate diagnosis thus made means a great deal for the child as well as the mother. In the second place, there must be a careful study of the mechanical factors in this mechanical problem. We must know whether the pelvic canal is large enough to let that fetal head pass through; in other words, we must know the relative size of passenger and passage. The knowledge of that is the solution of the problem. When we come to the labor itself, as has been said here, often it is not the use of the forceps, but the delay in the use of the forceps, that has caused an intracranial damage. It means that women must not be left too long in the second stage of labor. After determining that the head is too large to go through the canal, the woman should be subjected to cesarean section and the baby relieved from the danger of the long compression. Only by improved methods of obstetrics shall we meet this problem of intracranial hemorrhage. While we are at present meeting this condition, we must extend this ability by having the obstetrician of small experience so study the problem that he can estimate the relative size of the passenger and the passage and not allow a woman to go into labor who should not. Regarding the application of the forceps, there must be accurate diagnosis of the position and ability to change an occiput posterior into an occiput anterior. With these precautions and a selection of the cases for cesarean section and for the forceps, we shall improve the art of obstetrics and solve the problem which is before us today.

DR. CHARLES K. MILLS, Philadelphia: I shall confine myself to one point, that is, the explanation of the manner in which the result is brought about as regards epilepsy, mental defect, etc. Every body is familiar with instances of gross hemorrhage, but the conditions which result in these cases of cerebral traumatism during delivery of most importance are not of this kind.

Many years ago I became interested in the observations of Duret on cerebral traumatisms, and later also I published one or two papers on cerebral hemorrhage. These observations of Duret on traumatism, my own and those of others, I think, gave the key to the manner in which these conditions of mental defect, epilepsy, etc., may occur. Duret dropped his animal from a certain height. In some instances large hemorrhages took place, and in others not; but in all his experimental cases necropsies were made and certain definite conditions were found, and those conditions were similar to those which I found in my studies of cerebral hemorrhage. A case of cerebral hemorrhage and apoplexy of the usual or unusual type is one in which the brain is hit a blow from within, whereas in the case of the experimental trauma it is hit from without. I found in these cases of cerebral hemorrhage of severe and sudden type, conditions almost identical with those which were found by Duret in his observations on animals which he had subjected to experimental falls. He found what I observed, widely distributed, minute hemorrhages both in the membranes and in the cerebral substance, in certain particular locations there being more marked than elsewhere. The interesting thing is the pathogenesis of these cases. I have always thought that Duret's theory of traumatism was probably correct: that when a blow is struck on the skull from without, the results are due largely to the displacement in a peculiar way of the extraventricular and intraventricular cerebrospinal fluid. Occasionally he found examples of fracture of the floor of the fourth ventricle. The theory was that this fluid, suddenly displaced by a traumatism from within or blow from without, caused sudden extravasations by the withdrawal of the support usually afforded to the walls of the vessels.

Regarding therapeutics, I can say nothing except to endorse what has been said about the importance of concluding labor. There is not only prolonged pressure, but a series of jams and recoveries which play just the part necessary to produce these disseminated hemorrhagic foci. In regard to the examination of these brains by obstetricians, I think too much attention has been paid to large hemorrhages. Examinations should be made with elaborate care to discover all that is present in these children when death results.

DR. G. L. BRODHEAD, New York: One of the sentences in Dr. Stein's paper is open to criticism in a very friendly way, but I know his views are in accord with mine. He said that instrumental delivery can never be so prolonged or so profound as the molding which takes place in protracted labor. We all know that in many cases of contracted pelvis the child gets into the world alive only because of the prolonged molding. In his series of 562 cases at Vineland Dr. Stein mentions 125 difficult labors, in fifty-four of which no instruments were used; and his statement that the statistics in our institutions are defective is borne out in this instance. He says that in fifty-four cases no instruments were used, but we have no idea from the statistics how many breech presentations there were. We know that in breech delivery there is a mortality of from 10 to 15 per cent. Some infants die immediately; some within a week or ten days. If these institutions would only endeavor to ascertain the details of the brith records of these babies, especially when born in a city institution where complete records are obtainable, much valuable information would be obtained. Dr. Stein referred to the employment of forceps being more serious than prolonged labor. In this I do not agree, because if forceps are used as they should be, there is less danger in the operation than in a very prolonged labor. I agree with Dr. Stein in disagreeing with Dr. Harris and others that labor has no influence on the development of the child's brain. It seems to me only rational to say that if pressure causes birth palsy, we certainly may look for brain abnormalities from the same cause. If the nerves are affected, why not the sensitive brain?

Dr. Stein also brought out an important point about delaying the forceps operation until the fetal heart beat was practically inaudible. I think we cannot attribute bad results to forceps when we wait until the child is practically dead and then apply instruments.

I agree with him on the value of pituitary extract in prolonged labor. One point not mentioned was the danger of giving pituitary extract in some of the cases in a protracted second stage, with the cervix dilated and the head right at the outlet. I am sure I have lost several babies by giving pituitary extract when the head was in the pelvis ready to be extracted. Pituitary extract in some of these cases causes such a tonic contraction of the uterus that the child loses its life from asphyxia. I know that Dr. Stein believes with me that cesarean section in selected cases of pelvic contraction is attended with better results than allowing the labor to be unduly prolonged.

DR. E. D. FISHER, New York: A number of years ago I was interested in this subject and wrote a paper at that time in conjunction with Dr. Peterson, including a consideration of the hemiplegias and diplegias. An interesting point was the great destruction of the brain tissue. There was not so often a meningeal as a capillary hemorrhage or vascular disturbance in the cortex of the brain, the symptoms varying according to the area involved. The cases which came to necropsy showed very marked degeneration of the brain structure. Improvement or recovery was almost impossible with such defective conditions. My experience has been that delayed labor is more often the cause of this condition, which is a purely mechanical one, not developmental, than the application of forceps. I agree with the essayist on the importance of this subject and the desirability of an extensive and long continued investigation regarding it. Instead of talking about the protracted labor, we must state what we mean. When is it long? Is it in the first stage or second stage? That is of the utmost importance. As I understand it, the dangers are chiefly from disturbance of the circulation, with direct compression of the child. I think every obstetrician

will admit that the danger of the death of the child is very greatly dependent on the character of the uterine contractions. If the contractions are weak, labor may go on for hours and there is no danger to the child's life. As a matter of fact, most of the lengthened labors are prolonged in the first stage; the contractions are not strong enough to dilate the cervix. The question is largely a mechanical one.

Dr. Alfred B. Spalding, San Francisco: A median episiotomy in my experience does not add to the dangers of complete laceration and does relieve the child from severe head pressure in primiparous labors. When there is pressure on the head during the perineal stage of labor, oxygen given to the child via the placenta will cause even asphyxia pallida babies quickly to turn pink and rosy. Many children can be saved from injuries due to asphyxia of the cortical centers by giving the mother oxygen under pressure while she is under the influence of an anesthetic.

Dr. Samuel J. Druskin, New York: I have seen a number of cases of fractured skull in prolonged labors with mechanical deliveries. Under the use of pituitary extract I have seen in the first twenty-four hours some cyanosis in the child, with a mottled appearance of the skin and an eruption somewhat like urticaria. Although these conditions disappear, whether there is a degree of permanent impairment I do not know. I have recommended pituitary extract for a number of years. It is necessary, however, to call attention to some of these incidents.

Dr. Hugh T. Patrick, Chicago: I am glad to know that obstetricians may anticipate these difficult and dangerous labors and thus avoid birth palsies. I would emphasize the fact that a large proportion of these palsies occur in firstborn. That is to say, these are the cases in which investigation of the pelvis and the position of the child is of the greatest importance. Another point not yet mentioned is the considerable number of these cases in the prematurely born; that is to say, the child is small and no difficulty is anticipated. I presume that in these children the brain and blood vessels are much more delicate and friable than in the full-term child. Consequently the greatest care should be exercised by the obstetrician. I would also suggest that the obstetrician thoroughly examine the child a few weeks after birth. I do not know how many times I have heard my obstetric friends congratulate themselves and each other after a difficult obstetric procedure that they had a living mother and a living child, it never having seemed to occur to them that this living child might be a very defective child. Now in the case in which the obstetrician congratulates himself on having brought a living child into the world, he should watch that child, or, what is perhaps better, get a competent neurologist to do it. He should be the first to discover the bad effects of the delivery. If, as has been said by one of the leading obstetricians here, occasionally the best of them lose a child, what is a fair proportion between the dead babies and the injured heads of the living babies? I do not know; I presume nobody knows. I should say, however, that for every dead child an obstetrician gets, he gets three with an injured brain. These are the children he ought to know about before the labor begins. Idiocy or imbecility without paralysis is very rarely due to birth injury.

Dr. M. Allen Starr, New York: Like Dr. Patrick, I have been defending obstetricians all my life and trying to relieve them of the responsibilities of these idiocies and palsies. I would call attention to the fact not brought out that in an analysis of 100 necropsies on idiots, only from 19 to 20 per cent. were really due to hemorrhage in the brain. There are defective conditions of development in the brain—porencephalia, atrophy, and various conditions covering 80 per cent. of the cases of idiocy. Therefore, it seems to me that we cannot in this large number of cases blame the obstetrician, and that we can relieve the self-reproach of the mother by assuring her that in a given case the chances are that the condition of the child is not due to her contracted pelvis, and that is a psychologic element which should not be ignored for the comfort of the mother.

Dr. Max Rosenthal, New York: It has always seemed to me that obstetricians might do for this complication what they have done for ophthalmia neonatorum. We all know that idiocy and spastic conditions follow birth palsies. I do not think we realize, however, how often epilepsy and brain disturbance late in life are the result of a slight injury at birth, a vascular injury occurring perhaps in the silent area of the brain yet which makes itself felt by development of idiocy or of paralysis. We must not forget that the brain at birth is in a developmental period. A great deal of the cellular and glandular development takes place after birth. Therefore, if injury occurs there it not only jeopardizes what is there, but also the possibility of future development. Furthermore, I think that some mention should be made of Dr. Cushing's effort to operate for the hemorrhages in birth palsies. There are not many cases on record but we should all bear the subject in mind, especially the obstetrician. I never see these cases until two or three weeks or a month after injury, when it is too late to consider operation for relief of the clot. Obstetricians should realize the possibility of operation in these severe hemorrhages of the new-born.

Dr. Adolf Meyer, Baltimore: It is obvious from this discussion that if we are to make any progress in the question of the influence of labor on the subsequent mental development of the child, the work will have to be done where there are good obstetric records, early collaboration between obstetrician and neurologist or psychopathologist, and adequate follow-up work. My one time teacher, Pinard, showed in a study of heredity how close the obstetrician stands to the family and to the debatable origins of early defects. An examination of the children with a record of the various types of birth stress or birth accident shortly after birth and again about the age of four or five or the early school years can alone promise dependable statistics.

Dr. P. B. Salatich, New Orleans: We tried operation on the patients with hemorrhage, but so many died that we abandoned the practice. In many cases in the first stage of labor one finds the cervix dilated but that the head remains high. Should such cases terminate normally there is still so much pressure that hemorrhage is likely to occur. If, after vaginal examination, and pressure from above, the head still will not engage, we know that it is either too large or that there is a disproportion between the pelvic brim and the head. Cesarean section should be done in such cases. I do not think we spend enough time on the careful examination of our patients. If all primiparas were examined carefully, and if we found in some cases a diminution of half an inch and advised that about the eighth month something be done, I think we would not have so much trouble at the end of the pregnancy. Of course, the patient may wish to continue the pregnancy, with the possibility of the cesarean section. Many decry pituitary extract because they do not use it in the right way. I now use it when the cervix is slow in dilating, giving 1 or 2 minims. When the cervix is dilated I give about 5 minims. When the head is down on the perineum and the pituitary extract has lost its effect, I give the patient 8 minims. If the perineum offers great resistance, I do an episiotomy. Of course it reads nicely in books, trying to hold the weight of the baby down in the last two months. In some cases you can succeed, but in about 75 per cent. the women are content to have large babies. You do not always have the truth from your patients, and you find that they will not eliminate the carbohydrates or alcohol.

Dr. Charles R. Ball, St. Paul: I have wondered for some time why this subject has not been given more consideration. It is important to consider every measure for the prevention of these injuries, but after they occur what shall be done and how are they to be recognized in the new-born? What are the symptoms of cerebral injuries occurring during parturition? We may have perhaps a blue baby, which is hard to resuscitate, and for the few days following birth is exceedingly quiet and still. One might feel inclined to say that such a baby was a good baby because it did not cry. This condition of quietude simply means that the baby has received a serious shock and this shock is still continuing. Within a day or two, many of these babies who have received intradural and extradural hemorrhages have convulsions. It seems to me that in cases presenting such symptoms a care-

ful examination should be made to determine as nearly as possible, whether there are any symptoms of brain localization, such as paralysis, etc. If, therefore, we have a blue baby, one difficult to resuscitate, in which one side of the body seems more helpless than the other, and, particularly if there are convulsions, why is an exploratory incision not a rational procedure? Make a very small trephine opening, slit the dura and raise it up in order to see if there is any hemorrhage.

I believe that we ought to pay more attention to such symptoms as I have described in new-born babies and thus endeavor to prevent the subsequent physical, moral and mental defects which such injuries cause.

Several years ago I recommended an operation on a 3-year-old baby which did not develop intellectually or physically. It was found at the operation that along the whole side of the skull on the left side there was a regular dent, which perhaps might best be described as a greenstick fracture of the skull. Under this depression was an immense cyst pressing and flattening the brain. Had this baby been carefully examined after birth, this condition would have been recognized and remedied. I have no doubt but that there are many other symptoms of hemorrhage which will enable us to recognize it in the new-born, and when we are able better to do this why should we not apply the simple surgical principles which we apply to other conditions?

DR. HENRY P. NEWMAN, San Diego, Calif.: If this is a criticism of the obstetrician, to whom does it apply? To the man trained in his profession? No. Unfortunately obstetrics is the privilege of every licentiate in medicine, and a large percentage of the births are presided over by the pseudo-obstetrician. Consequently it would be hardly fair to ascribe to the trained professional man such faulty work. But what is the remedy? It is not the question of the use or nonuse of forceps, cesarean section, etc. It is the personal equation and the individual management of the individual case. The trained obstetrician of today studies the individual case before, during and after delivery, and his success or failure is not written in ten days or ten months, but by the ultimate welfare of both mother and child.

DR. ARTHUR STEIN, New York: Naturally, I fully agree with Dr. Brodhead about the molding of the child's head in a contracted pelvis. I agree with him also that in these cases the forceps should not be put on unless the head is low down. Regarding the use of pituitary extract, I do not agree with Dr. Druskin at all. Judiciously used it is a great help. I do not think that up-to-date obstetricians would like to do without it. We made many experiments with pituitary extract at Dr. Brodhead's division at Harlem Hospital. We standardize the method to some degree; that is, we use as little as possible, employing 2 and 3 minims at hour and hour and a half intervals, thus increasing to some degree the physiologic contraction of the uterus. With 1 c.c. we used to get tetanic contraction. I furthermore do not agree with Dr. Druskin that the drug has ill effects on the children. In the induction of labor at full term we use the small dose.

We are at a great disadvantage in the study of cases coming under the scope of my paper in not having the advice of the neurologist in the cases of babies born in big hospitals. These cases are not systematically studied from the neurologic standpoint after long or difficult labors. Therefore, I fully agree with Dr. Meyer when he says that such studies should be carried out.

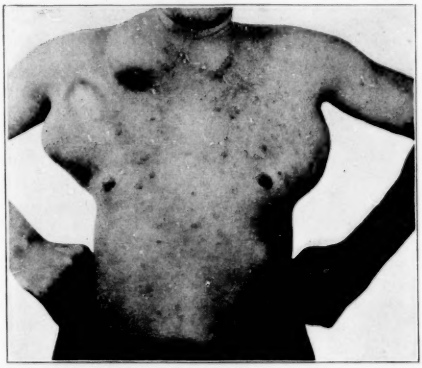

Fig. 1 (Case 6).—Prurigo-like exanthem in Hodgkin's disease; note enlarged glands.

THE CUTANEOUS MANIFESTATIONS OF HODGKIN'S DISEASE: LYMPHO-GRANULOMATOSIS *

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From a careful study of seventy cases and from a review of the literature, Ziegler,[1] in 1911, felt that one fourth of all cases of Hodgkin's disease, at some time or another in the course of their trouble, showed evidence of skin involvement. Bunting and Yates[2] quote Westphal as finding 15 per cent of his cases with skin lesions.

To me, these percentages seemed rather high until I began to go deeper into the subject and look more particularly for these manifestations. After about two years of careful observation of such cases, I feel that these writers are probably correct in their figures. It is my belief that all too frequently cutaneous lesions of lymphogranulomatosis are not noted because they have not been sought after, and it is my object to call the attention of the medical profession to this interesting and as yet not generally recognized series of symptoms.

Osler defines this disease, first described by Hodgkin in 1832, as a "condition characterized by enlargement of the lymph-glands with progressive anemia and a fatal termination. Anatomically, there is an increase in the adenoid tissue of the glands, proliferation of the endothelial cells, formation of mononuclear and multinuclear giant cells, the presence of eosinophils and thickening of the fibrous reticulum."

The cutaneous symptoms of Hodgkin's disease may either precede, accompany or follow after general manifestations. Ziegler says that in from 5 to 12 per cent. of the cases, the cutaneous symptoms came first. Westphal[3] says that in about 10 per cent. of his cases a lichen-like eruption preceded the onset. Again, the skin lesions may accompany the generalized symptoms or what is probably the most common type; they follow other signs of the systemic condition — it may be even one to two years afterward and sometimes longer.

And what, it may be asked, are the symptoms noted? Probably the commonest of these is a pruritus of

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* Owing to lack of space this article has been abbreviated in THE JOURNAL by omission of some of the pictures. The complete article will appear in the transactions of the section and in the author's reprints.

1. Ziegler, Kurt: Die Hodgkinsche Krankheit, Jena, Gustav Fischer, 1911. This contains a complete review of the literature.

2. Bunting and Yates: Bull. Johns Hopkins Hosp. April, 1917, p. 151: November, 1915, p. 315.

3. Westphal, quoted by Bunting and Yates: Bull. Johns Hopkins Hosp., April, 1917, p. 151.

greater or lesser intensity. It is quite often the first sign to call the patient's or the physician's attention to the condition. It is sometimes so intense that I have seen large, deep grooves in the skin marking the imprint of each finger-nail; again, there may be a pruritus with absolutely nothing to be found on the skin. It was noted eight times in our series of thirty-four cases, and by Zeigler eight times in his series of seventy cases.

Marani[4] says that he always notes a close relationship between pruritus and an eosinophilia. I have been unable to corroborate it, finding that these attacks generally come with a fresh glandular "flare-up."

In my opinion the next commonest lesion is a prurigo-like exanthem. These papular lesions, capped often with vesicles which are soon torn off by the scratching, are most often found on the extensor surfaces, but may be all over the body in a severe case. There are always more or less accompanying excoriations, scars and pigmentations. Often these lesions come and go for months. In Blaschko's[5] case they disappeared when the throat lymphomas were removed, only to return later with recurrence of the latter.

Wechselmann,[6] Nicolau[7] and others also report a diffuse exfoliating erythrodermia, though this is rather rare.

Urticaria has been seen in many cases of Hodgkin's disease. Kreibisch[8] reports a generalized case preceding other evidence of the disease six months.

Edematous swellings also are noted, and may be permanent or transitory in character. Pigmentations are seen frequently in lymphogranulomatosis, and are either spotted or diffuse. The brownish or bronze pigmentation is most often in the folds of the joints abdomen, neck, face and extremities, and is much like that in Addison's disease, except that the mucous membranes are not involved. We also find pinhead and larger chloasma-like spots on the arms, hands and face. The first type was noted in four of our cases.

It is common to get a history of outbreaks of perspiration due to disturbance of the heat regulating functions. Disturbances in the nutrition of the skin are also common, such as alopecia, dryness of the skin, atrophy of the skin, and hyperkeratosis.

Fig. 3 (Case 9).—Closer view of patient.

Icterus is noted at times, and purpuric lesions are far from uncommon.

Grosz,[9] Hecht,[10] Ziegler,[1] Bruusgaard[11] and a few others also describe reddish or bluish tumors in the skin which, on being opened, have a bloody serous fluid, and are of a tissue typical histologically for Hodgkin's disease. This has been termed by Grosz[9] "lymphogranulomatosis cutis." They are rare, to say the least, and we have one such case in our series.

Through the kindness of Drs. G. W. Crile and C. F. Hoover, I have been enabled to go over the records of the surgical and medical services at the Lakeside Hospital from 1902 to date. I find notes of twenty-nine cases, in most of which the diagnosis was made either by gland examination at operation, necropsy or biopsy. There were twenty-four males and five females. I wish to add four cases of my own, and one seen in consultation with Dr. John Phillips. In age they varied from 18 months to 55, most of the patients coming between the years 15 to 30. In this series of thirty-four cases there were thirteen showing more or less cutaneous symptoms and lesions in connection with their generalized condition.

REPORT OF CASES

CASE 1 (2725).—J. F., man, aged 27, first noted lumps in his neck five years before coming to the hospital, and three years later was first troubled with a pruritus. A note made at this time read, "Generally distributed over the body, but more marked on the extensor surfaces; there are irregular pigmented areas split-pea to lentil size which apparently mark the site of a papillary eruption. In some places crusts may be seen still adherent, while at the periphery there is an augmentation of the pigment. The skin is harsh to the touch and is of a brownish or bronze tint as if the suprarenals were involved."

CASE 2.—D. R., aged 27, had a markedly pigmented skin following some enlarged glands in the neck one year before.

CASE 3.—In M. M., girl, aged 4 years, the trouble started with a slight cold and a gland anterior to the right ear, then with an enlargement of the abdomen. There were petechiae over the abdomen and the scapulae.

CASE 4.—J. H., aged 18, was troubled with pruritus. The pathologic diagnosis was lymphosarcoma.

CASE 5.—A. E., man, aged 43, for sixteen years had a swelling under the right arm; but in the last five months the patient was troubled with a gland in the neck. Two months after their excision he was troubled with pruritus. Blood culture was negative.

4. Marani, G.: Arch. f. Dermat. u. Syph., 1914, **120,** 781-869.
5. Blaschko: Arch. f. Dermat. u. Syph., 1908, **89,** 43.
6. Wechselmann: Arch. f. Dermat. u. Syph., 1907, **87,** 205.
7. Nicolau: Ann. de dermat. et de syph., 1904, p. 753.
8. Kreibisch: Arch. f. Dermat. u. Syph., 1908, **89,** 43.
9. Grosz: Beitr. z. path. Anat. u. z. allg. Path., 1906, **39.**
10. Hecht: Arch. f. Dermat. u. Syph., 1909, **98,** 107. Pinkus: Arch. f. Dermat. u. Syph., 1899, **50,** 37, 177.
11. Bruusgaard, E.: Arch. f. Dermat. u. Syph., 1911, **106,** 105.

CASE 6 (3932).—W. G., man, aged 30, was troubled with intense pruritus and a lump in the right axilla and seven months later in the right side of the neck. The skin was of a bronze color and covered with excoriated papules, as shown in Figure 1. He had an alopecia areata of the back of the head, and masses in both axillae and both sides of neck, but especially in the right side. Blood examination revealed: red blood cells, 3,800,000; white blood cells, 10,600; hemoglobin, 67 per cent; Sahli, differential, polymorphonuclears, 53 per cent; small mononuclears, 3 per cent.; large mononuclears, 6.5 per cent.; transitionals, 2.5 per cent.; eosinophils, 35 per cent. A histologic diagnosis of Hodgkin's disease was made from glands removed at operation.

CASE 7.—M. S., man, aged 28, for one year had been troubled with a painless increase in the size of his neck and chest. Lately he had had great difficulty in breathing, and swellings in the axillae which had finally broken down. He was troubled greatly with pruritus. The skin was covered over with numerous prurigo-like papules, some of them having been changed by scratching into small ulcers and scars. The glands under both jaws and in the axillae, as well as the mediastinal glands, were greatly enlarged. In both breasts there was marked edema of the tissues, and masses not connected to the skin were palpable. The liver and the spleen were both enlarged. Blood examination revealed white blood cells, 17,600; polymorphonuclears, 80 per cent.; small mononuclears, 1.9 per cent.; large mononuclears, 15.1 per cent.; transitionals, 2.6 per cent; mast-cells, 0.2 per cent.

Fig. 4.—First stages in Hodgkin's disease of the skin, showing edema of tissues and small cell infiltrations around the vessels.

CASE 8.—P. H., boy, aged 14, had had the symptoms of cold, chills, fever, nausea and vomiting followed three months later by a swelling over the left shoulder in the supraclavicular space. There was a marked bronzelike pigmentation of the axillary skin, folds of the neck, about the eyes, and diffuse over the abdomen, thighs and legs. Some purpuric lesions were also noted over the thighs and legs. Blood examination revealed: white blood cells, 16,200; polymorphonuclears, 92.5 per cent.; transitionals, 4 per cent.; small mononuclears, 2 per cent.; large lymphocytes, 1 per cent.; large mononuclears, 0.5 per cent. Blood culture and culture of glands were negative.

CASE 9.—L. H., man, aged 30, had had weakness and anorexia of one year's duration followed several weeks after the onset by a generalized pruritic eruption. Four months after the trouble began, he had large glands in the groins which were operated on in a local hospital. Afterward the masses recurred, and of late he has had generalized increase in the size of the glands with an intense pruritus of the whole skin (Figs. 2 and 3). The skin was in a generalized hyperemic and edematous condition, dotted over profusely with papules and deep excoriations which had advanced to an ulcerative condition in spots. There was a marked edema of the scrotum and right leg, while the glands were generally enlarged. This was especially true in the supraclavicular spaces, right and left axillae and groins, while large masses of glands were palpable in the abdomen. The chest showed impaired resonance in the right axillary region. Blood examination revealed: red blood cells, 3,392,000; white blood cells, 14,800; hemoglobin, 65 per cent. The stained smear revealed slight poikilocytosis, increase in the central pole area and enormous increase in the blood platelets. The differential count, 300 cells, revealed: polymorphonuclears, 89.3 per cent.; small mononuclears, 3.6 per cent.; transitionals, 5.3 per cent.; eosinophils, 0.8 per cent.; large mononuclears, 0.5 per cent.; basophils, 0.3 per cent.

The patient was very irritable, sank rapidly, and died in twelve days; we were allowed to remove only an abdominal gland for examination. It showed an extremely marked fibrosis in some places with replacement in part of the germinal centers by endothelial cells, giant cells, large multinucleated cells, lymphocytes and eosinophils, that is, the typical picture of Hodgkin's disease. A piece of apparently normal skin showed practically no change outside of a slight dilatation of the vessels of the dermis and a very slight cellular infiltration. Examination of the diseased tissue, however, revealed signs of a more advanced process (Fig. 4). The epidermis was swollen and edematous, showing a defective keratinization. The papillae also showed a tissue infiltrated with serum and a certain number of small mononuclear elements. Deeper in the dermis there was quite a marked collection of cells around the vessels and glands. These were mononuclear in type, though here and there an endothelial and an eosinophil were to be found.

CASE 10.—H. F., man, aged 25, seen with Dr. J. M. Moore, reported that eighteen months previously the glands of the neck had begun to swell. A few months later the inguinal glands also became larger. Six months after the onset the patient had the cervical glands removed and for six weeks there was relief, after which they recurred again. About this time he first noted an eruption on the skin which gradually became intensely itchy. There was a history also of dizziness and shortness of breath (Figs. 5 and 6). The entire skin was covered with a papular eruption in different stages, the larger lesions having had their tops scratched off and crusted over. The eruption was a little more marked on the extensor surfaces. There was some pigmentation of the skin due to scratching. All the cervical glands were enlarged, especially on the left. The chest showed increased dulness to the right

and left of the sternum in the second interspace, while the axillary and inguinal glands were also involved. The liver was palpable two finger breadths below the costal margin, while the spleen could not be felt. Blood examination

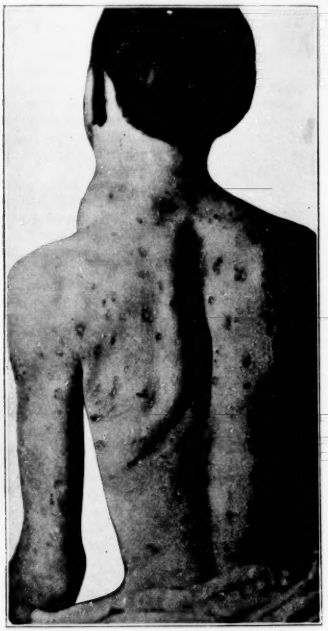

Fig. 6 (Case 10).—Prurigo-like exanthem in Hodgkin's disease.

revealed: red blood cells, 5,280,000; white blood cells, 21,000; polymorphonuclears, 78.4 per cent.; eosinophils, 1.4 per cent.; transitionals, 8.4 per cent.; large mononuclears, 1.2 per cent.; small lymphocytes, 4.0 per cent.; large lymphocytes, 10.6 per cent.; hemoglobin, 70 per cent. An oxydase staining reaction done by Dr. Christie revealed granular cells, 89.1 per cent.; nongranular cells, 10.9 per cent. The patient remained in the hospital only a few days and refused further examination of tissues, glands, etc.

CASE 11.—E. B., man, aged 37, seen with Dr. Samuel Bernstein, had had anal pruritus fifteen years before which was treated off and on until 1914, when the nerves were excised, giving relief. In May, 1915, I was consulted because of a troublesome urticaria which reacted by July to treatment. In March, 1914, he had a swelling in the right supraclavicular region thought to be due to an abscess, which was opened and drained. After this the glands alternately came and went, and finally one was excised and a diagnosis of Hodgkin's disease made by Dr. Warthin of Ann Arbor. The patient has since been treated with the Roentgen ray and radium but with no permanent result, as the glands have continued to grow; several have broken down, and a mass of them has increased rapidly in the left supraclavicular area. The patient has been greatly troubled for months with pruritus and night sweats.

The skin was entirely clear outside of a large irregular rhomboid shaped lesion 3 by 5 cm. in the left supraclavicular region (Fig. 7). The mass showed quite a marked induration and was apparently fused to the glands beneath, while in its center it was broken down. It was a light bluish, and to the distal side several smaller lesions the size of a hickorynut were noted, one of them being broken down. The glands under the arms were markedly enlarged. All the superficial glands were found markedly enlarged, and there was found an increase in the bronchial glands on percussion and Roentgen examination. The liver and spleen were not enlarged; otherwise nothing important was found. Blood examination revealed: red blood cells, 5,300,000; white blood cells, 16,400; hemoglobin, 70 per cent.; eosinophils, 0; transitionals, 5 per cent. A differential count of 300 cells revealed: polymorphonuclears, 87 per cent.; large mononuclears, 1.6 per cent.; small mononuclears, 6.3 per cent. Platelets were markedly increased. Blood culture was negative, and from a discharging axillary gland a pure culture of staphylococcus was procured. A large section was removed (*x*, Fig. 7) including both normal and diseased tissue.

The apparently normal skin showed slight small cell infiltration around the vessels of the corium, all of which were somewhat dilated. The mass removed from the edge of the ulcerating tumor showed a densely infiltrated tissue. The epidermis was low, and at one end where the ulceration was situated, the section showed an acute inflammatory reaction (Fig. 8). In the remainder of the section all the vessels showed a more or less marked cellular infiltration of eosinophils, endothelial cells, lymphocytes and a few fibroblasts around them (Fig. 9). Deeper in the tissue and in more or less relation to the vessels and glands were large masses of well defined cellular infiltrates made up of large endothelial cells, large cells with a multinucleated nucleus such as is described by Reed, giant cells, lymphocytes, eosinophils and fibroblasts. In some places the eosinophils were very

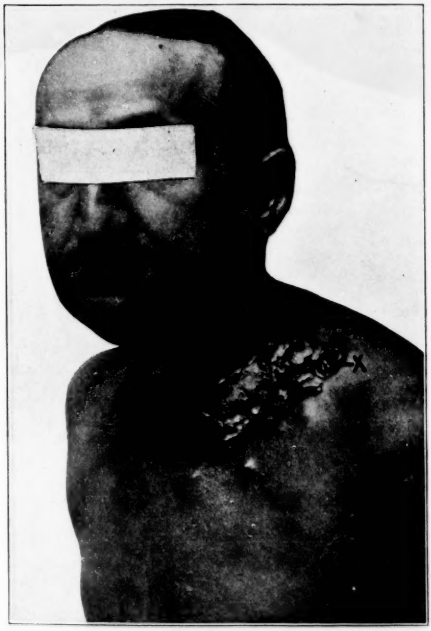

Fig. 7 (Case 11).—Histologically true Hodgkin's tumor in the skin; section removed at *x*.

numerous. There was little or no normal tissue left in these cellular deposits, and in one portion the cellular masses extended up in long strands toward the epidermis, which was quite edematous.

CASE 12.—J. B., man, aged 44, had had painful swelling of glands in the axillae in August, 1916. The pain subsided soon but then the cervical glands began to increase in size, and shortly all the glands in the body were involved. He entered Lakeside Hospital on Dr. Hoover's service in February, 1917, and took Roentgen-ray treatments, which helped him greatly. At this time the white blood count was 12,000, about 60 per cent. being polymorphonuclear in type. The oxydase reaction showed about 80 per cent. granular cells. Cultures from an excised gland were negative; a diagnosis of lymphosarcoma was made by Dr. H. T. Karsner and Dr. Christie. The patient was discharged, but returned, April 15, with a recurrence of the glandular swellings and the history that three days previously he had noticed an eruption on his arms and chest (Figs. 10 and 11). Examination revealed a macular eruption over the entire body but most marked on the arms, chest, thighs and forehead. All the glands in the body, especially the supraclavicular glands, were markedly enlarged. After a few weeks in the hospital the patient developed edema of the elbows, knee joints, scrotum and penis, while the eruption had become progressively a deeper red, and pruritus had developed on the lower limbs. On the forehead, especially, the eruption had become a diffuse deep bluish, and showed some induration. Petechiae developed in the lower limbs and arms as well.

Blood examination revealed: red blood cells, 4,400,000; white blood cells, 58,000; hemoglobin, 70 per cent. The white count gradually rose to 152,000, and a differential count now revealed: polymorphonuclears, 5.7 per cent.; small lymphocytes, 86.3 per cent.; large lymphocytes, 5.9 per cent.; mast cells, 0.2 per cent.; transitionals, 1.5 per cent.; eosinophils, 0.4 per cent. (Fig. 12). A section removed from one of the bluish macular areas and stained with the ordinary stains showed a tissue with an edema especially marked around the vessels, glands and follicles. There was an intense cellular infiltration around the deeper vessels of the corium made up entirely of a uniform cell type deeply staining and much like a small mononuclear or a little larger. This infiltration was also found around the deep glands, both sebaceous and coil, and around the hair follicles. The areas were sharply defined instead of spreading out into the tissues and between them. In a well developed area there was an almost total loss of all stroma or reticulum.

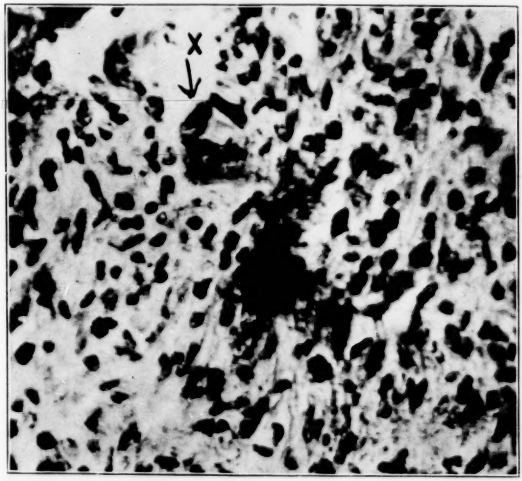

Fig. 8 (Case 11).—Tumor mass of endothelial cells, fibroblasts, deeply staining granular eosinophils, and large giant cells (at *x*): × 1,300.

This was probably a case of lymphosarcoma changing into a leukosarcoma in the short space of a few weeks.

CASE 13.—S. M., man, seen through the courtesy of Drs. John Phillips and S. L. McManigal, had a papular eruption distributed over the entire body and moderate in amount. Some of the lesions had been scratched and were crusted over, while there was more or less pigmentation of the skin. The cervical, bronchial and inguinal glands were all enlarged, while the spleen showed an increased dulness to percussion.

Blood examination revealed: red blood cells, 4,600,000; white blood cells, 26,000; hemoglobin, 80 per cent. The differential revealed: polymorphonuclears, 80 per cent.; small mononuclears, 3 per cent.; large mononuclears, 9 per cent.; transitionals, 5 per cent.; eosinophils, 2 per cent.; basophils, 1 per cent.

This seemed to be a prurigo-like exanthem in a case of Hodgkin's disease of advanced type.

SUMMARY OF CASES AND COMMENT

Among thirty-three cases of Hodgkin's disease and one questionable case, thirteen involvements of the cutaneous surfaces were noted. Pruritus was the principal complaint eight times, a prurigo-like exanthem was seen six times, a bronzelike pigmentation four times, petechiae twice, urticaria once, and edematous swellings three times. In Case 6 the patient had an alopecia areata, and in Case 10 partially broken-down tumor masses were found in the left supraclavicular space, showing tissue histologically characteristic of lymphogranulomatosis cutis. In Case 12, which was a probable lymphosarcoma, it changed into a leukosarcoma in the short space of a few weeks.

From an analysis of our cases and from the literature, we believe we are justified in drawing several deductions. The skin lesions caused by Hodgkin's disease can probably be classified in two groups: (1) a true lymphogranulomatosis cutis represented by our Case 10, by those of Bruusgaard,[11] Grosz,[9] Hecht,[10] Ziegler[1] and perhaps a few others, and (2) a group of lesions, set up, it is true, by the general infection, and yet not showing the characteristic histologic changes locally. A classification much like that of Audry's and Arndt's may be used for systematizing our findings. Under the "pseudoleukemids" or "pseudolymphadenids" we would place the purpuras, prurigo-like exanthems, pruritides, urticarias, pigmentations, edemas, some of them disturbances of nutrition, as in our case of alopecia areata, and some of them cases of universal exfoliating erythrodermia. These lesions are a general result of the systemic infection, if such it be, on the entire system. Their histologic picture, of course, varies with the condition, but in most cases shows nothing characteristic or possible of a diagnosis of lymphogranulomatosis. In a few words, it probably consists of a peripheral dilatation of the vessels, some edema of the tissues, and a greater or lesser small cell infiltration around the vessels, coil and sebaceous glands. Ziegler puts it well when in substance he says:

The changes in prurigo one should diagnose as granulomatous with caution, and the same is also true in urticaria,

pruritus and other eczematous conditions. They are, however, important in that on these grounds the localized small specific areas of the lymphogranuloma may develop. The mere signs of skin atrophy, loss of lanugo hairs, hyperkeratosis, etc., should not be spoken of as specific, but they speak more for a wanting nutrition of the organism.

To my mind they also speak of a toxemia like the tuberculids in tuberculosis. And as I have said before, in contrast to the latter, I do find in the literature and from my group a small number of cases with quite another skin change.

There is a definite cellular infiltration with lymphocytes, eosinophils, endothelial cells, fibroblasts, giant cells and large multinucleated cells. These areas show quite a marked vascularity with edema of the tissues and more or less destruction of tissue stroma and replacement with fibrous tissue. These cases are true examples of Hodgkin's disease of the skin, and are of a class like Case 10, with definite tumor formation, or perhaps occasionally like the two cases reported by Wechselmann[6] and Nicolau[7] with diffuse exfoliating erythrodermia.[12]

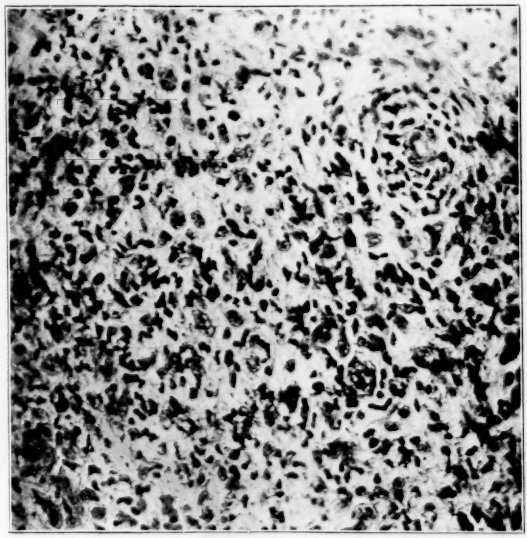

Fig. 9 (Case 11).—Endothelial cells, fibroblasts and multinucleated cells; × 310.

As Marani[4] says, "The same irritating substance may call forth different reactions, and different irritating substances may be the cause of the same or closely related reactions." The French school in general believes mycosis fungoides to be a cutaneous form of Hodgkin's disease. Ziegler,[1] Wechselmann,[6] Hazen and Strobel,[13] I believe, and others take the same view. Bunting and Yates[2] have had three cases of pseudoleukemia with Hodgkin's blood picture occurring for months and in one case over years. In one case seen by them the Hodgkin's blood picture was succeeded before the patient's death by a picture of an acute lymphoblastic leukemia. We are all acquainted with the case of mycosis fungoides reported by Pardee and Zeit[14] which just before death showed the signs of lymphatic leukemia, confirmed also at necropsy. Witness my Case 12 with a change from a possible lymphosarcoma to a leukosarcoma in the short space of a few weeks. Dr. Wende's[15] case of probable Hodgkin's disease with transformation before death to a leukemia is also brought to mind. Pelagatti[16] has seen clinical mycosis fungoides with leukemia of the blood. Any pathologist knows how often a clinical diagnosis of lymphosarcoma is turned into one of Hodgkin's disease at necropsy and vice versa. Many believe it is impossible from a skin section to distinguish between Hodgkin's disease, mycosis fungoides and some of the other related conditions.

I heartily agree with Bunting and Yates that if all the efforts spent to separate these conditions had been used to correlate them, we should probably be nearer to the solution. It certainly seems to be an infection, and I hope to report my bacteriologic findings and a comparative histologic study more in detail in a later paper.

Suffice it to say that in any case of suspicious, persistent pruritus, urticaria, prurigo-like exanthem, bronzelike pigmentation, etc., of unexplainable origin, a possible Hodgkin's disease should be kept in mind and suitable examination of blood and glands should be made.

The treatment of the condition is, of course, rather hopeless. External local antipruritics should be used with the Roentgen ray for both the skin involved and the glands.

Bunting and Yates report good results from the total extirpation of the diseased glands, focus of infection and follow-up Roentgen ray. Arsenic internally and good hygiene are also to be recommended.

Note.—We have since heard from Dr. Yates that the patient in Case 13 has died, necropsy showing very marked involvement of the bronchial and retroperitoneal glands. Specimens were made from all tissues and we hope in a later paper to include this data.

2073 East Ninth Street.

ABSTRACT OF DISCUSSION

Dr. Henry H. Hazen, Washington, D. C.: The first point I should like to make is whether or not we are justified in absolutely separating neoplastic growths from inflammatory growths. At the present stage of our knowledge I do not believe that we can be too dogmatic on this point. A study of this group of diseases would seem to indicate that there may be a resemblance. As bearing on this point, McDonough's work on the "Evolution of the Sarcoma Cell" should be borne in mind.

12. For the relation of Hodgkin's disease of the skin to the leukemias, leukosarcoma, lymphosarcoma, lymphodermia perniciosa of Kaposi, mycosis fungoides, etc., I would refer the reader to the highly suggestive work of Bunting and Yates (Footnote 2). They believe that these diseases are probably all of one general type of infection, but with different manifestations.

13. Hazen and Strobel: Jour. Cutan. Dis., 1911, **29**, 147. This contains a review of the literature.

14. Pardee and Zeit: Jour. Cutan. Dis., 1911, **29**, 7.

15. Wende, Grover: Am. Jour. Med. Sc., 1901, **112**, 826.

16. Pelagatti, quoted by Nanta: Ann. de dermat. et de syph., 1912, Series 5, No. 3, pp. 572, 639, 694.

In regard to Hodgkin's disease, I think we should be careful not to accept the bacteriologic findings of Bunting and Yates as absolutely final, for similar results have been found

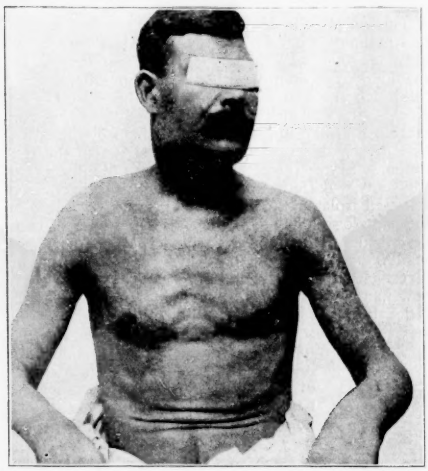

Fig. 10 (Case 12).—Leukosarcoma with skin involvement.

in apparently normal lymph glands. Also, it should be borne in mind that it is frequently difficult for clinicians actually to diagnose this disease, inasmuch as there is considerable discussion both as to the histologic and clinical pictures, as Warthin has shown. Further, I cannot accept the blood picture of the increased relative and actual transitional cell count as being pathognomonic. I was particularly glad to hear Dr. Cole speak of leukosarcoma, for we rarely hear of this condition in American literature.

As regards classification, it is possible that we can make six divisions. First, the group of lymphomatoses, which may be divided into the leukemic, represented by lymphatic leukemia, and aleukemia, in which group mycosis fungoides and Hodgkin's disease should be placed. The second great group is the myelomatoses, the leukemic stages of which are represented by the so-called splenomyelogenous leukemia and the aleukemic stage by multiple myeloma. The third great group are the lymphosarcomas, in which the leukemic stage is represented by leukosarcoma and the aleukemic stage by lymphosarcoma. As to whether or not there are any mixed types, we are uncertain, but it is theoretically possible. It should always be borne in mind that practically all of the aleukemic conditions may become leukemic, and that the leukemic conditions may have aleukemic stages.

DR. SIGMUND POLLITZER, New York: In the development of any science or any special department of knowledge we have first the crude, isolated observations, then more numerous observations and a closer study of details, and finally there comes the genius who groups all the observations, draws general deductions and classifies our knowledge of the subject. In looking over the group of diseases which forms the subject of the admirable papers presented, one is struck with the fact that while the last twenty years have added very greatly to our detailed knowledge of the conditions, we are as far as ever from a general understanding of the subject as a whole. The Darwin of the lymphatic diseases of the skin has not yet been heard from. What is lacking at present is a knowledge of the etiology of these diseases, and until we have found the causative agent or agents, we shall be groping in the dark. We do not know whether we are dealing with distinct types of disease, or whether all these conditions are merely variants of a single type. In the meanwhile a study of the origin of the different types of cells found in varying degrees in all these conditions is of primary importance, and in this respect an observation of Dr. Wise seems very suggestive. I refer to the group of proliferated endothelial cells shown in the corium in one of his pictures. We have a marked proliferation of endothelial cells in the lymph nodes in many leukemic conditions, and the occurrence of a similar proliferation in the skin seems suggestive of a close connection between the lymphatic endothelial hyperplasia and the disordered white cell balance.

DR. HAROLD N. COLE, Cleveland: In studying the slides of Dr. Fraser I would say that in two of the specimens he showed of glands I am unable to determine between them and a case of Hodgkin's disease, such as I have. They are absolutely identical. Is it not significant that in all these cases we get a history something like this: Following diseased tonsils or diseased teeth, or some other focus, they first notice a swelling of glands in those parts of the body, and later a deeper involvement; the patient becomes exhausted, and finally dies.

I am not here to stand up for Bunting and Yates. In only one of our cases did Dr. Graham get a diphtheroid organism from a gland and later at necropsy; but we should take up and study these cases both clinically and histologically.

DR. J. FRANK FRASER, New York: One point in regard to diagnosis is that in the early or erythematous stage of mycosis fungoides it cannot be differentiated from psoriasis or parapsoriasis on histologic grounds alone.

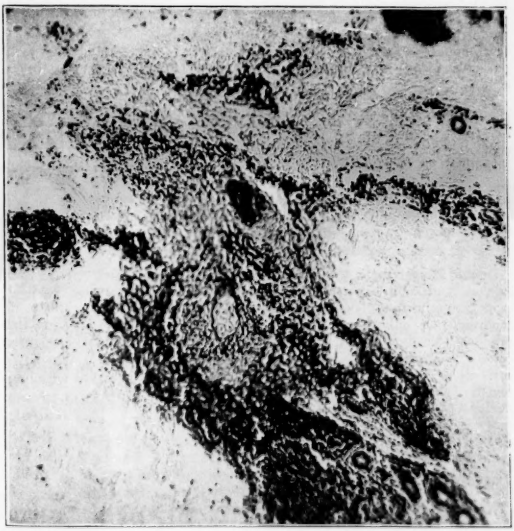

Fig. 12 (Case 12).—Leukosarcoma; × 60; dense cellular infiltration around vessels, glands and hair follicle; cells uniform in size and character.

In regard to the relation of mycosis fungoides to the leukemias, the histologic picture in the lymph nodes may be the same. From a study of the cells in a single section it

may be impossible to differentiate between a leukemia, lymphosarcoma or leukosarcoma, which is an infiltrating lymphoid tumor with a leukemic blood picture. We know little about the nature of the leukemias. Mallory and his followers say the process is neoplastic, the blood picture representing a circulating metastasis.

I consider that dermatologists have been making a mistake in regarding mycosis fungoides as a disease of the skin alone. In all the cases in my study there was general involvement of lymphoid tissue. In two there was involvement of the lungs, and in one of them, thickening of the bronchi was demonstrated by Roentgen-ray examination several months before death. The other patient is now under treatment at Dr. Trimble's clinic, and is suffering from a cough which does not yield to treatment. I think the whole subject offers a great field for further investigation.

DR. FRED WISE, New York: Some of the facts brought out by the papers in this symposium tend to support certain conceptions, in my mind, with regard to diseases of this type. The interpretation of the clinical pictures included in the papers presented is a matter of some importance, especially to those who teach dermatology. Mycosis fungoides, for example, seems to be a disease *sui generis*, presenting clinical features which differ from other, closely related, but not identical dermatoses.

In presenting a patient with mycosis fungoides before a section of students, we are compelled to limit ourselves to an exposition of the clinical features of that disease, without regard to the histopathologic findings, which may not be at hand at that moment, or may never come to light, with respect to that particular case.

If the cutaneous picture is the familiar one recognized as mycosis fungoides, let it be called by that name. Never will I forget the case of a patient brought to the clinic by Dr. Fordyce several years ago, who presented an eruption so typical of mycosis fungoides that the youngest member of the clinic staff made the correct diagnosis at a glance. A few minutes later, examination of the patient's blood revealed a lymphatic leukemia.

The point I want to bring out is, that this patient presented a dermatosis which, before a class of students, should be designated mycosis fungoides on clinical grounds. Speaking before a body of trained dermatologists, the much broader conception of this class of diseases, their inclusion in groups embracing the various diseases of lymphatic origin, may be profitably dismissed.

Fig. 1.—Scar from operation by Dr. Gay in 1887.

Dental Education in New Zealand.—Consul General Winslow at Auckland (*Commerce Reports*, July 12, 1917) says that the minister of public health of New Zealand has reported that only fifteen dental students have been fully graduated during the past six years from the only recognized dental college in the dominion. The great majority of the students leave school before graduation and practice under registered dentists. There are 763 registered dentists in New Zealand, of whom only sixteen registered during the five years ending with 1916, and some of them came from outside colleges, some from American dental colleges. The latter are said to stand well. At the meeting of the New Zealand National Dental Association in Wellington in April, 1917, resolutions were passed and forwarded to the government covering the following points: matriculation examination of the University of New Zealand be adopted as the standard entrance examination for the certificate of proficiency in dentistry; a two-year course to be sanctioned at any center where teaching facilities are provided, plus two years at the Dunedin Dental School; the proper authorities to be asked to establish a board of dentists to arrange and conduct the course for the certificate of proficiency in dentistry.

TUMORS OF THE CAROTID BODY*

F. B. LUND, M.D.
BOSTON

Tumors of the carotid body have great surgical and pathologic interest, but are not of so rare occurrence as they were at one time thought to be. Dr. Scudder[1] of Boston described a case in 1903, which I think was the first case reported in this country; Dr. Keen[2] of Philadelphia, in a comprehensive and extremely interesting article, first called the attention of the American medical profession to the condition. Since then, Drs. DaCosta,[3] Callison and McKenty,[4] Balfour and Wildner,[5] and others, have reported isolated cases and have written at length on the pathology of the condition. The number of cases described in the literature, which Dr. Scudder stated in 1903 were seven, and which Dr. Keen, by his investigation in 1906, increased to twenty-six, have now increased to about a hundred; and these curious little tumors have been dissected, studied, and described almost *ad nauseam et ad infinitum*.

This case is presented for the reason that it is the only one that I have found in a review of the literature in which operation has been successfully performed for an intercarotid tumor on both sides of the neck; the first operation, on the left side of the neck, at the Boston City Hospital by Dr. George W. Gay in 1887, up to which time, so far as I can find, no cases had been reported in the literature; and the second operation, on the right side, which required the ligation of the common carotid and removal of an inch of the internal carotid having been performed by me in 1916, twenty-nine years later. The patient, now at the age of 54 years, is in perfect health. The fact that Dr. Gay failed to recognize the nature of the tumor does not detract from his skill in removing it, for this was one of the few patients from whom these tumors have been removed without ligating the common carotid; and the fact that he was able to do this, probably made it possible for me to remove the tumor on the other side, twenty-nine years later. This tumor had attained considerable size, and its vascular connections were such that I found it quite impossible to remove it without at the same time ligating the common and removing a portion of the internal carotid artery; a serious operation, as the statistics show, in a patient 54 years of age, and one which might have induced either death or hemiplegia had not the vessel on the other side, owing to the skill of Dr. Gay, been left intact.

Reported cases show that the removal of these very vascular tumors has been attended with a noteworthy mortality which Keen found was over 25 per cent.

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

1. Scudder, C. L.: Tumor of the Intercarotid Body: A Report of One Case, together with All Cases in Literature, Am. Jour. Med. Sc., September, 1903.
2. Keen, W. W.: Tumors of the Carotid Gland, THE JOURNAL A. M. A., Aug. 18, 1906, p. 469.
3. DaCosta, J. C.: Ann. Surg., 1913, **58**, 426; Report of a Case of Tumor of the Carotid Body, Ann. Surg., 1906, **44**, 393.
4. Callison and McKenty: Ann. Surg. 1913, **58**, 740.
5. Balfour and Wildner: Surg., Gynec. and Obst., February, 1914.

In fifty-four patients reported by Callison and McKenty, they found that forty-two patients recovered and twelve died; but to this number should be added four deaths from recurrence, and six other speedy deaths in prospect from recurrence known to be in existence when the case was reported; a total of twenty-two deaths out of fifty-four cases.

Complications.—Keen stated that only seven of the twenty-seven patients collected by him recovered without complications. The reason for these high mortality and disability percentages is not far to seek, for the tumors are very vascular, they are situated between and behind the carotids, lie against and sometimes invade the internal jugular, and are in relation to and sometimes incorporated with the pneumogastric, glossopharyngeal, hypoglossal and spinal accessory nerves.

In at least six of the cases described in the literature, a portion of the pneumogastric never had to be removed, and in all these cases the patients died of pneumonia.

Keen reported two cases of injury of the sympathetic, four of the hypoglossal, and two of the lingual nerve. In thirteen cases, Keen reported that the internal jugular had to be tied, and most of these patients died of edema of the lungs.

Only fifteen of the fifty-four cases reported by McKenty escaped without ligation of the common carotid. In thirty-two cases, all three carotid arteries had to be tied.

The injury of either of the common carotids, the internal jugular vein, or the pneumogastric nerve is attended with danger, and in undertaking an operation on an intercarotid tumor of any size, we may find it unavoidable to ligate or remove portions of all three of these structures. The tumors sometimes involve the internal carotid as far as its entrance into the base of the skull, as in DaCosta's and McKenty's cases. In McKenty's case the operation had to be abandoned on account of technical difficulties, and this has also been the experience of others who have tried to remove these tumors. In fact, the danger of these operations appeared so great to DaCosta[4] whose first patient suffered complete hemiplegia on the eighth day — that he advised against operation on these tumors unless recent rapid growth had led to a suspicion that invasion of important neighboring organs had taken place; or, in other words, a semimalignant condition had ensued. These tumors, for many years at least, may be regarded as benign. They are of slow growth, and when small are painless, in fact, causing no symptoms. Often the surgeon is not consulted until the tumors have attained the size of an egg, and are painful, the pain often radiating to the ear and attended by dysphagia (hypoglossal), pupillary contraction (sympathetic), and vasomotor disturbance of the vessels of the neck and face. As they grow, the tumors invade progressively the arteries and veins, and their removal becomes more difficult and dangerous. It seems to me that, whenever possible, they should be removed when small, since they are then often not closely attached to the carotid, are certainly not malignant, and may sometimes be removed without subjecting the patient to the dangers of carotid ligation. The general rule for the early removal of all tumors should hold in these cases. Gay applied it in 1887 in the case cited, with a result that speaks volumes for the benign character of the tumor in its early stages and emphasizes the difference between the simplicity and safety of his operation and the difficulties and dangers which universal evidence has shown attends late surgical procedures.

Fig. 2.—Scar from second operation ten days after removal.

The Intercarotid Body.—These tumors are derived from the intercarotid body, which has been studied and theorized on extensively. Certain facts seem to emerge. Normally, it is a little body about the size of a kernel of wheat, and is situated at the bifurcation of the common carotid artery, usually at its inner side. It exists in all embryos, and persists after birth, but usually disappears about puberty. It it persists, it may undergo development into the intercarotid tumor now under consideration.

The best summary of our knowledge of this subject is that given by McKenty.[4] A careful perusal of his article and also that of Wildner[5] will show the earnest seeker after truth that since von Waller first dissected these bodies in 1766, they have been regarded as a ganglion, a gland, an epithelial organ, a vascular organ, and a rudimentary organ. They are now regarded as "chromaffin organs" from some peculiarity of their staining qualities, and as connected with the sympathetic nervous system, to which they are remotely related. The most influential member of the chromaffin family seems to be the suprarenal gland, the active principles of which we employ for raising blood pressure and stopping hemorrhage.

In regard to its physiologic activities, we learn that Mulon used a watery extract of the carotid bodies in horses, with which he produced a rise of blood pressure in rabbits. Another investigator, using a glycerin extract, produced a fall of blood pressure in cats. You may apparently take your choice. As Callison says:

"Its small size, and the contradictory results of experimental work, and the lack of clinical observation, indicate that whatever function the gland may have is not important."

Clinical Signs.—When tumors of this little gland occur, the history is somewhat as follows: A small, hard, painless tumor appears in the neck of an adult, between 20 and 50 years of age. It causes no symptoms, and does not induce the patient to consult a physician until its size produces noticeable deformity. It is on a level with the top of the thyroid cartilage, movable laterally but not vertically, and has an appearance of pulsation, which is found on examination not to be expansile, but due to the fact that the internal or common carotid artery is in front of it. If at this favorable stage the tumor be removed, it may be found that it is not as yet attached firmly to the carotids, and may be dissected free and removed, as was done by Dr. Gay in the case described. At this stage, in my belief, the growth is certainly not malignant.

As the tumor enlarges, it progresses in a downward and upward direction, often growing around and surrounding the carotids so as to require their removal;

and sometimes, actually involving the internal jugular in the growth. The neighboring veins are involved, and paralysis of the recurrent laryngeal, with loss of voice, and difficul y in swallowing, results. The recurrent laryngeal fibers are caught by the tumor while still in the vagus. Irregularity of the pupil on the affected side, pain and stiffness of the neck and shoulder ensue.

The diagnosis is not often made. McKenty states that it was recognized before operation in only seven of the cases reported by him. In my own patient, I made a probable diagnosis, and should have felt practically certain had I read the case record of Dr. Gay's operation before I did my own.

Pathology.—The tumors are brown, dark red or gray, and all have identical structure; they are very vascular, showing abundance of large and small vessels in the fibrous partition walls surrounding masses of cells, the so-called *Cellballen* of German investigators, or alveoli, as they are more properly called; and may often be much diminished in size by squeezing the blood out of them (Fig. 3). They look in gross and on section like aberrant thyroids, and Balfour removed one during the course of a thyroid operation under the impression that such was its nature. He had to remove 4 inches of the internal jugular vein, and his patient had a hemiplegia, which was permanent and occurred two weeks after the operation. They have been called at various times epithelial, when the tumors were thought to be derived from branchial rests, of endothelial origin, etc. The width of the capillaries is often remarkable, and the surface of the tumor is covered with a large network of veins, which renders removal difficult.

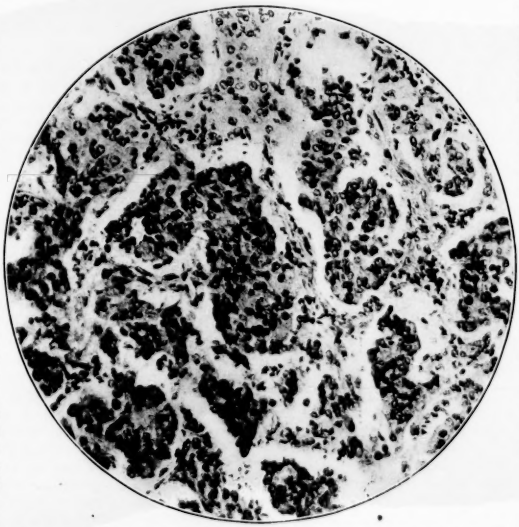

Fig. 3.—Section of tumor showing arrangement of alveoli and blood vessels.

These tumors apparently begin as hypertrophies of the normal organ, and grow five, ten, twenty, or thirty years without causing trouble, and are certainly benign for a long period. My one case is evidence of the benign character in the early stages, for no recurrence had taken place twenty-nine years after removal without tying the carotid. Invasion of the carotid has been noted in one old case, and of the jugular vein also in one case; metastases in the lymph nodes have been noted in a few of the late cases. Metastases in the liver have been observed in one patient dying without operation. It is certain that, after many years, they may grow rapidly, invade surrounding structures, and become, in fact, at least locally malignant. Recurrence, Balfour states, has been noted in about one fourth of the cases (incomplete removal?).

Regarding my own case: Does the history leave any doubt as to the nature of the tumor? Does the description leave any doubt?

REPORT OF CASE

History.—The patient was a young woman from Martha's Vineyard, a school teacher, who had always been well and had never noticed anything abnormal until a friend called her attention to a little tumor just under the angle of the left jaw, a little below her ear. It did not cause her any pain; in fact, she never noticed it herself. It was about the size of a filbert. Dr. Coffin examined it and suggested an operation. The lump remained about the same for fifteen months, and in the following nine months nearly doubled in size.

On admission to the hospital about two years after the lump was first noticed, the physical examination revealed a little fullness just under the angle of the left jaw. A small tumor or swelling about the size of a walnut was felt, which was probably connected with the artery. It was pulsating and apparently expanding. Bruit was heard over the tumor and there did not seem to be any special pain on p essure. The operation at the Boston City Hospital was performed by Dr. George W. Gay; Dr. J. B. Walker, now of New York, who was then house surgeon, wrote the history.

First Operation.—An incision was made in a line over the carotid from the middle of the clavicle along the front of the sternomastoid up to th angle of the jaw; the tissues were carefully divided and dissected apart by the handle of the knife and director down to sheath of v ssels. The nerves were not cut, but carefully pulled to one side. The sheath was opened and vessels laid bare just above the omohyoid muscles. As there was some doubt about the character of the tumor, it was thought best to expose it, hence the incision was prolonged to the apex of the mastoid and dissection was carefully carried down until the tumor was reached. It was found to be enclosed in a distinct smooth capsule and to lie beneath the carotid, rising in front and behind so as to partially embrace it. There was considerable difficulty in removing it on account of its depth and its intimate relation with the vessels. On removal the tumor was found to be of an oval form, the size of a large walnut; on section, dark reddish brown, and of fleshy consistency. The carotid was exposed bare to its sheath for a distance of about 1½ inches. There was quite profuse hemorrhage from the walls of the cavity; one small artery was tied, the remaining hemorrhage being stopped by pressure. The edges of the wound were well approximated with a continuous catgut suture, a drainage tube was inserted at the lower end of incision, and a gauze dressing applied.

Subsequent History.—The patient married and had one son, who was 22 years old when she consulted me, Nov. 10, 1916. The patient herself was now 54 years old. She had

been well until two or three years ago, when she began to have noises in her head, but she had noticed for sixteen years a lump in the *right* side of her neck.

Present Examination.—A thin woman, with a scar 4 inches long on the left side of the neck, extending from the angle of the jaw nearly to the clavicle, along the anterior border of the sternomastoid muscle. This wound had evidently healed by first intention. In the bottom of the scar could be felt the common carotid artery. In the right side of the neck, there was a tumor the size of a hen's egg, which at first appeared to pulsate, but the pulsation was found to be due to the fact that the common and internal carotid artery ran over the top of the tumor. The tumor was movable from side to side, but not from above downward; part of it lay behind the upper portion of the sternomastoid, and it had extended from the tip of the mastoid down to the top of the thyroid cartilage. The common carotid felt about twice the normal size. The internal carotid could be felt running across the upper part of the tumor.

The pupils were equal and reacted normally to light; knee-jerks were normal; and physical examination in other respects was normal. There was no swelling inside the pharynx. A diagnosis was made of tumor of the intercarotid body, and the operation was performed, Nov. 14, 1916.

Second Operation.—An incision 4 inches long was made along the anterior border of the sternomastoid muscle, and the tumor was found to be covered with a network of large veins extending from the external and internal jugular, facial, and other veins in that region. There were several enlarged lymphatic glands on the surface of the tumor. On account of bleeding, it was difficult to expose the tumor, but after clamping a number of veins, the lower end of the tumor, shown in Figure 4, was exposed, and it was found that it could be shelled out with the finger. Passing the finger around it, however, caused profuse venous bleeding. This could be readily stopped by lifting the tumor, which was then found to be held in place by the common, internal, and external carotids, which held it back like a tight band. The common carotid was then divided between the clamps, numerous veins were clamped, and the tumor was lifted out and separated from the veins attached to its under side. About one inch of the internal carotid was removed just above its origin. The innominate, external, and internal jugular veins were exposed for some distance, but did not have to be tied. The spinal accessory nerve was exposed, but the hypoglossal nerve was not seen. After tying numerous bleeding points, the wound was sutured with a small rubber tissue drain at its lower angle. The head was fixed in a stiff pasteboard collar. For a few days she was hoarse and complained of difficulty in swallowing. The drain was removed the following day; on the second day, the dressing was removed. The wound healed by first intention, and she left the hospital in two weeks, in good condition. In June, 1917, she was presented at the meeting of the American Surgical Association in Boston, and was in excellent health.

Fig. 4.—Photograph from painting of tumor; natural size.

COMMENT

The case seems to me of great interest as one in which operation was performed at a time when only four other patients had been operated on: Marchand's, by Regnier in 1880, and Paltauf's three patients, operated on by Maydl, Dittel and Gersuny in 1886. Marchand's article was not published until 1891, hence Dr. Gay had no literature to help him in making the diagnosis.

A pathologic examination of the tumor was made by Dr. Coffin, who referred the patient to Dr. Gay for operation, but he could not find the sections twenty-nine years later, when he referred her to me.

Many of the patients as old as 54 years in whom the carotids have had to be tied in removing the tumors, have died; therefore the outcome of the operation on my patient was fortunate.

The mortality of ligation of the common carotid is about 10 per cent. and 23 per cent. of the patients have cerebral symptoms. It seems evident that, in spite of Keen's advice, these tumors should be, if possible—as it sometimes is in the early cases—dissected off the vessels without ligating, for they are not malignant.

So far as I have been able to determine, this is the only patient in whom these tumors have been operated on successfully on both sides of the neck.

527 Beacon Street.

ABSTRACT OF DISCUSSION

DR. STANLEY STILLMAN, San Francisco: This interesting paper by Dr. Lund, together with papers by Calston and McKenty, which were presented to the New York Academy of Medicine four years ago, and an article by Balfour and Widener in *Surgery, Gynecology and Obstetrics*, in 1914, leave little to be said on the subject of the nature and pathology of these tumors. I think the point made by these later writers that the intercarotid body is a paraganglion and belongs to the chomaffin group of the sympathetic nervous system is well taken, and that the tumors are not endotheliomas, but are of nerve cell origin, and the finding of the cells in the tumor is conclusive evidence of their nature. I am inclined to think the tumors are much more common than is generally considered to be the case. In 1906 I heard Dr. Keen's paper before this association, and at that time, judging from the admission of a number of prominent surgeons present, hardly any one knew of the existence of these tumors or of the gland itself. Dr. Keen's case was the fourth recorded in this country. Dr. Scudder reported the first in 1903. Dr. Keen collected twenty-nine cases in his paper. In the next seven years the total number of cases doubled—more than thirty. Dr. Winslow, in a paper presented before the American Surgical Association in 1916, had collected twelve additional cases occurring in the previous three years. In March of this year I prepared a paper on this subject, which was to have been read before this section, but which somehow got sidetracked in this discussion. In this paper I meant to report three cases occurring in San Francisco. These, taken with Dr. Lund's last, make eighty-three. That is, eleven cases reported in the last year only.

Two years after hearing Dr. Keen's paper I had a case in which I had no difficulty, from his description, in recognizing the tumor after I had once cut down on it. My immediate associates, Drs. Rixford and Thorn, were present at that operation. Seven years afterward Dr. Rixford had a case which he had no difficulty in recognizing when he cut down on it. Last year the sister of my patient, operated on in 1908, came to my office in my absence and was seen by Dr. Thorn. He bravely made a diagnosis of tumor of the carotid body and in my absence operated and found such to be the case. He was obliged to ligate the carotid and the patient died within twenty-four hours of softening of the brain.

It seems to me to be absurd that more than 3 per cent. of the total recorded cases should have occurred in San Francisco and in the practice of three men intimately connected with one another. I think it is, to a great extent, due

to lack of knowledge, and that there are cases scattered all over the country undiagnosed and being treated or operated on as sarcoma or something else.

No matter how successfully the operation is done so far as life is concerned, very few of these patients get well without some very unpleasant consequences of the operation. The pressure on the sympathetic nerve and manipulation trying to get out the tumor, result in disturbance. Ligation of the carotid is a serious thing. While the patients do not all die, the percentage of deaths from hemiplegia, persisting for a number of years, is high. Aphonia may be present, as it was in my case. My patient could not speak louder than a hoarse whisper and was most miserable in consequence. At the death of her sister I saw her, and at that time she had accommodated her vocal chords in such a way that she could speak loud enough so that you did not particularly notice the paralysis of the vocal chords.

The gravity of the prognosis should make it obligatory that the knowledge of the nature of these tumors should be widespread. The unexpected operation on one of these tumors, requiring ligation with its consequences, followed by the postoperative disturbances, make it difficult to explain afterward. It is much better to anticipate these things, and say that a tumor in this position may be of such a nature and may be followed by such consequences.

There is unquestionably a long period in my case, nine years, in Dr. Thorn's case of four years, in which the patient knew of the existence of the tumor. In my case I had operated nine years before for a postpharyngeal abscess. At that time I felt the gland about the size of a lemon and supposed it was a tuberculous lymph node, giving rise to a postpharyngeal cold abscess. When I operated on the patient the tumor extended from the base of the skull well down toward the lower part of the neck, and the removal of it was attended with good deal of difficulty.

Fig. 1 (Case 1).—Character of skull defect before operation.

There is no question that there is a period in which they are benign; afterward they become malignant. In regard to the possibility of removing them without ligation of the carotid, while it looks to be formidable and is formidable, still, with a combination of sharp and blunt dissection it is possible, in many of these cases, in spite of the oozing, which can be controlled by lifting on the tumor, to dissect them out, as mine was. The artery looked like the appendix after having shelled off the thickened peritoneal coat. It looked worm-eaten and I expected she might develop an aneurysm. So that you can practically strip off the sheath of the vessels and not jeopardize it so far as thrombosis or aneurysm is concerned.

DR. FRED B. LUND, Boston: I am glad that Dr. Stillman brought out the importance of making the diagnosis, if you can, in these cases, because the results of operation may be serious. My patient had aphonia for a short time; but it cleared up.

These tumors can sometimes be dissected off from the carotid as Dr. Stillman says, and he is to be congratulated on his success. A friend informed me that he had no difficulty in a similar case in lifting the tumor by a piece of tape and getting it out without ligation.

The definition of conservatism is interesting. It was a conservative procedure to do this operation on a small tumor, as Dr. Gay did. The result has been that the woman has had a long, happy life. If he had been one of the men who say, "Oh, I guess we will wait and see," she would have been dead, and such a procedure would not have been true conservatism.

Relative Values.—One principle in medicine is worth a volume of loose disconnected facts.—Dr. Benjamin Rush.

"SOUP BONE" IMPLANT FOR THE CORRECTION OF DEFECTS OF THE SKULL AND FACE*

W. WAYNE BABCOCK, M.D.
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PHILADELPHIA

In the five cases here recorded a prosthesis was obtained by embedding under the scalp or the skin of the face, portions of beef or mutton bone removed from the hospital "soup-kettle." The results are interesting as they are apparently contrary in many experiments — indicating that alien or devitalized bone introduced into the living tissue undergoes absorption or expulsion — and that such bone does not serve a useful purpose for the replacement of normal osseous tissue. It is evident, however, that most of the experimental evidence as to the transplantation of bone is based on experiments made on the long bones of the body, and it is quite possible that some of the results obtained in experimenting on bones developed from cartilage may not apply to those bones developed from membrane. We were, in one case, unsuccessful in transplanting a boiled bone from a recently amputated leg for a defect of the tibia, and have observed the rapid absorption of ivory pegs, although Lexer has even used masses of horn in the formation of new joints. At any rate, we can record the interesting clinical observation that large plates of dead foreign bone may show no external evidence of absorption or weakening two years after implantation under the scalp. It is probable that the dead bone serves as a scaffold for the ingrowth of new firm tissue.

CORRECTION OF DEFECTS IN THE SKULL

A defect of the skull may be objectionable on account of the disfigurement, the cortical irritation or epilepsy produced, or other symptoms due to static movements of portions of the brain through the opening. Congenital defects in the skull requiring correction are seen in hydrocephalus and cranial meningocele. Much ingenuity has been expended in the correction of these various defects. The area may be covered by portions taken from the outer table of the skull, used in the form of free transplants, or by an osteoplastic flap transplantation. Such osteoplastic closure has been found useful in small openings, but not so practicable for the larger ones. Alien substances, such as thin plates, often perforated, of silver, gold or other metal, have been used. Celluloid, ivory, hard rubber, horn, paraffin, cork and other materials have been embedded. Plates of sheet mica have been advocated by Kane.[1] Many of these substances are obviously undesirable. Silver filigree we found to be of insufficient strength, while Lane's plates placed in the form of bars across large openings in two instances were useful.[2] The alien substance may cause such a

* Read before the Section on Stomatology at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

1. Kane: Railway Surg. Jour., August, 1913.
2. Babcock, W. W.: Osteoplastic Surgery of the Face, THE JOURNAL A. M. A., Jan. 16, 1915, p. 203.

profuse serous secretion in the wound, or tissue irritation, as to necessitate removal. Paraffin and cork certainly should not be used. Autogenous tibial transplants have the advantage of being well tolerated, but require an additional operation with its added risk. Mauclaire[3] has filled these defects by transplants taken from the lower angle of the scapula, and by slices from the tubercle of the ilium, or from the great trochanter. Flaps of bone from the sternum were used in two cases by P. Müller.[4] An autogenous rib graft with attached periosteum was used by Kahle. These various substances are either laid over the defect or wedged into position, fixed by small hooks, which are dropped in drill holes placed in the edge of the adjacent bone or fastened by sutures, wires or screws to the skull, the pericranium or other tissue. The use of fat transplants to fill cranial defects we can hardly commend.

The "soup bone" implant here advocated has not only the advantages of convenient accessibility, mobility and sufficient size, but apparently produces, when embedded, little or no irritation of the adjacent tissue, and seems to give a strong and perhaps permanent closure.

TECHNIC

A bone taken from the soup-kettle has the advantage of having less animal matter than a fresh bone. Care must be taken, however, that it has not been rendered too brittle by prolonged boiling. The scapula, on account of its size, thinness and porous medulla, is preferred. Such a boiled bone of a sheep or ox is selected, rinsed, reboiled for one hour in a large quantity of water, then removed and placed over night in a 1:20 solution of phenol (carbolic acid). Previous to the operation, it is again boiled for a third time for at least one-half hour in plain water. By this time most of the animal matter has been removed, the bone is somewhat softened, and can be readily cut into the required shape by a heavy pair of scissors, by bone-cutting forceps, or a heavy cartilage knife. The spine of the scapula is cut away, ridges and rough surfaces removed, the bone trimmed and contoured to the required shape and perforated by many drill holes placed about one-half inch apart. A flap of the scalp with its margin well beyond the defect is then raised, or a sufficiently long straight incision made over the area, the periosteum separated from the margins of the defect and stripped well back, and the prepared "soup bone" fitted into or over the opening, being contacted with the living bone and wedged or fastened under the margin of the raised periosteum. Fixation may be aided by a few sutures of chromicized catgut. Absolute hemostasis is important, and the skin margins should be accurately sutured in position, no drainage being used. The stitches are removed on the third or fourth day. If later there is a marked serous accumulation, this is removed under strict aseptic precautions by introducing a grooved director through the wound, the opening made being permitted to close at once, as continued drainage would probably be followed by infection and expulsion of the alien bone. The bone soon becomes fixed in its new position and is probably early permeated by new blood vessels.

Fig. 2 (Case 1).—Flap of scalp turned back and piece of scapula (drilled) sutured to fit defect in skull.

CASE 1.—*Epilepsy and cranial deformity following osteotomy and injection of paraffin. Not relieved by removal of paraffin. "Soup bone" implant with relief from convulsions and good cosmetic result.*

A. H., man, aged 33 years, German, laundryman, with negative family and previous history, in 1903, while cleaning a German service revolver, was accidentally shot, the bullet entering the temporal bone about two inches in front of the upper part of the lobe of the ear on the right side and ranging forward and upward. He was taken to a hospital in Bonn, Germany, and a part of the temporal and frontal bones down to and including a part of the right supra-orbital ridge removed. Two weeks later paraffin was injected to fill the large defect. The paraffin softened and gradually became lumpy and irregular. Nine years after injury he began having epileptic convulsions, at first every three months. The paraffin was removed in 1912, in Philadelphia. No relief followed, the convulsions occurring from two or three times a week to two or three times daily. The convulsions were preceded by formication in the scar, were initiated by retraction of the head to the left, and were followed by troublesome headaches. April 13, 1915, he was operated on at the Samaritan Hospital, a flap being raised along the lines of the two previous operations, dense adhesions separated, and a portion of the perforated scapula of a sheep fitted into the defect. The wound healed without irritation despite the large amount of scar tissue from the previous operations. The patient left the hospital in one week. A marked reduction in the number of convulsions followed the operation. Since December, 1915, or over one year, under small doses of ferrocyanid of iron the patient has had no convulsion, and has been practically free from headaches. In September, 1916, he was struck a violent blow over the implant by a door, without harm. The contour of the frontal region is well restored, and after two years the edge of the "soup bone" can be easily felt and shows no sign of absorption. The implant is firmly fixed, painless, and apparently very strong. Some small overlying nodules of paraffin can be felt in the scalp.

CASE 2.—*Large cranial defect with vertigo and epilepsy from palpation or movement. "Soup bone" implant with apparent perfect result after nearly two years.*

M. L., man, aged 39 years, Irish, cowboy, was brought to the Samaritan Hospital Jan. 16, 1915, having been picked up unconscious on a trolley car. Examination showed a large defect in the skull, and palpation of the area was followed by a generalized convulsion. On regaining consciousness the patient gave a history of having been kicked in the back of the head some years previously, following which a craniotomy was performed. On standing there was a large cup-shaped depression in the right upper occipitoparietal region, and on bending over, the brain bulged through the opening causing great vertigo, or an epileptic convulsion. Horseback riding (galloping), pressure over the depressed area, or nervous excitement, likewise incited convulsions. The patient therefore was unable to work. There is slight deafness of the right ear, and marked headache and pain near the right ear and back of the neck. Operation was performed Feb. 3, 1915, under local anesthesia. A flap of scalp was raised and the dura and pericranium separated from the edge of the defect. A portion of boiled sheep scapula, perforated and trimmed to size, was fixed in the defect by

3. Mauclaire: Presse méd., July, 1914.
4. Müller, P.: Zentralbl. f. Chir., 1915.

fine chromic gut sutures. The implant was contacted with the living bone, the scalp being replaced and sutured without drainage. A transient hyperpyrexia, without other symptoms, attributed to alien proteins in the dead bone, followed the operation, after which the patient made a perfect recovery. In January, 1917, the patient reported at the hospital as being able to work and free from symptoms.

"Soup bone" prosthesis seems to be deserving of a trial in the correction of osseous deformities of the face and jaw where fat implantation is not feasible. For the correction of saddle nose, defects in the supra-orbital or infra-orbital ridges, depressions in the malar or supramaxillary regions, loss of zygoma and for defects or irregularity of the mandible, the alien bone suitably contoured may be tried. In three cases of saddle nose we have introduced this form of dead bone, using portions of the spine of a scapula. In each case the alien bone was contacted to living bone, the technic being similar to that which I described before this section in June, 1914,[2] and that later was illustrated by Dr. John B. Murphy.[5]

Fig. 3 (Case 1).—Photograph after healing had taken place.

In inserting implants for saddle nose we have experienced difficulty in securing enough mobility of the skin to raise the bridge of the nose to the required height. For this reason it has seemed desirable in certain cases to do the operation in two stages: at the first operation introducing the largest implant that can be employed without undue tension of the overlying skin, while at the second operation, performed some months later, another implant is superimposed on the first.

CASE 3.—*Soup bone implant for saddle nose. Result maintained after over one year.*

A. K., woman, aged 25 years, single, with negative family and previous history, developed ocular symptoms at 8 years of age and was treated intermittently with inunctions of mercury for three years. At the age of 12 years a perforation developed in the hard palate, and later necrosis of the bones of the nose, leading to saddle nose.

Present Condition.—Saddle nose with perforation of the hard palate and loss of the right tonsillar pillar. The Wassermann test is +. Patient was prepared for operation by the use of mixed treatment internally, and salvarsan and neosalvarsan intravenously and intramuscularly. Operation Feb. 13, 1916, under local anesthesia. A vertical incision to the bone was made through a wrinkle line of the forehead, beginning at the frontonasal junction. Through the incision the skin was thoroughly separated from the underlying nasal bones by a pair of curved Mayo scissors. A portion of the spine of a boiled sheep's scapula was slid down from the forehead under the skin of the nose to correct the defect. The implant was contacted with the frontal and nasal bones. Some transient redness and inflammatory reaction followed the operation, perhaps due in part to the tension of the overlying skin, but primary union was obtained. Fourteen months after the operation the patient reports that she is married and pregnant, and that the implant has caused no trouble.

CASE 4.—*Syphilitic saddle nose. Implantation of soup bone. Recovery.*

M. L., girl, aged 18 years, with negative family and previous history, fell, six years ago, and broke (?) her nose, which remained sore, and for this she was treated in the Philadelphia Hospital for five weeks. Necrosis occurred which was arrested after one intravenous injection. The deformity —a marked saddle nose—has remained. The patient was admitted to the Samaritan Hospital, Nov. 3, 1915, and on Nov. 9, 1915, a wedge-shaped portion from the spinous process of a beef scapula was inserted through a vertical incision in the forehead, and contacted with the frontal and nasal bone as previously described. The implant caused considerable tension of the overlying skin, and there was some inflammatory reaction, which gradually subsided under antisyphilitic treatment. Primary union was obtained.

CASE 5.—*A syphilitic saddle nose in a child corrected by a soup bone implant. Bone not retained.*

M. R., girl, aged 9 years, white, was admitted to the Samaritan Hospital, Oct. 31, 1916, with a history that she had fallen the previous spring and injured the nose. The injury was followed by necrosis, and falling of the bridge of the nose, producing a marked saddle-nose deformity. Wassermann positive. Operation Nov. 11, 1916; anesthetic, ether. The incision was made in the left wrinkle line of the forehead to the frontal bone, and the skin of the nose raised and separated by blunt dissecting scissors. A bit of soup bone was suitably contoured, inserted, under tension and the wound closed by interrupted horse-hair sutures. Some edema of the nose with redness followed. The patient was discharged Nov. 5, 1916. Later suppuration occurred and the alien bone was removed.

5. Murphy, John B.: Murphy's Clinics, August, 1914.

ABSTRACT OF DISCUSSION

DR. GEORGE V. I. BROWN, Milwaukee: I have never used soup bones. There are a number of interesting questions which arise, however, that I trust Dr. Babcock will speak of when the discussion closes. For example, it has been said that various implants used for saddle noses, have, in the course of time, absorbed. Dr. Babcock did make some reference to that, but I should like him to elaborate a little and say what the experience is in that regard. Albee of New York, who does wonderful bone implantation work, says it is necessary to have autobone grafts to get results; that the same results are not obtained with any animal grafts.

Fig. 4.—Line of incision for insertion of alien bone in nose.

The cases referred to were interesting, inasmuch as there was present a definite factor which could be recognized; but I dare say that two years is hardly a sufficient time on which to base an estimate of the cure. I should like to know how long Dr. Babcock has had cases in which he has applied this graft, and how long a time his record of cure covers.

DR. T. W. BROPHY, Chicago: In the raising of broken or flat noses, I have found it possible to get enough soft tissue alongside of the nose, in the muscular tissue, to accomplish the work. Even soft tissue will hold out the skin and give the nose a very good appearance.

A colored man came to our clinic with a necrosis of the entire mandible. I nursed the sequestrum along for months,

cleaning the parts with antiseptics as thoroughly as possible, and there was in time generated a complete new mandible. We kept the skeleton or framework of necrotic bone there about which the new bone was formed, and then we removed the sequestrum piece by piece. We were obliged to remove small pieces of dead bone. An artificial piece, no matter what, put in position so as to hold the soft parts in place until the new bone can be generated, will prevent the collapse of the chin and prevent the intense facial deformity by holding out the parts until cicatrization is complete, even though new bone be not formed. In that way we are able to retain the parts in their proper place and get a very good result. The sequestrum serves the same purpose as an artificial piece.

DR. C. B. CORTRIGHT, Brooklyn: In regard to the lacrimal duct, in overcoming the saddle nose deformity, is there any distortion, and do the tears run down on the face? Is there any marked difference in the cornea?

DR. W. J. YOUNGER, Paris: Morestin of Paris uses a portion of a floating rig to supply noses. I have seen very respectable noses given to the soldiers.

DR. W. WAYNE BABCOCK, Philadelphia: What happens to the implant, as time goes on? We can simply refer to what we have seen in two years. With bits of firm material, like ivory, that have been embedded, we have found, in a few months, signs of marked absorption. We have been able to watch a subcutaneously imposed bone and find in two years no evidences at all of its absorption. Whether it will be absorbed in time we cannot say.

Fig. 5.—Method of preparing pocket for insertion of alien bone in nose.

The subject of bone regeneration and transplantation does not seem to be absolutely settled. Some one settles it for a few months and then some one else further experiments and upsets the matter. John B. Murphy felt sure that transplanted bone would be compacted with other living bone, and that there would grow into the canals of the transplanted bone new blood vessels from the bone with which it was placed in contact. Others have claimed that this is not so and have tried to prove it, and yet there is much to indicate that there is a big germ of truth in Murphy's idea. Some believe the periosteum has nothing to do with bone regeneration, and have shown by many experiments, where the periosteum of the lower jaw has been scraped down, that bone does not generate. The periosteum may be a limiting medium, and yet, on the other hand, there is ground for the belief that there is an inner layer of cells which may have something important to do with bone regeneration. Will a dead bone serve as a scaffolding? We do not believe dead bone remains as dead bone in the tissues, but if it can stimulate bone with which it is in contact to send into its porous structure new blood vessels, and can replace this alien bone by living material of an osseous or sufficiently firm nature to give a support and contour to the skull, then we have accomplished all that we wanted to accomplish. It is not that we want to keep the soup bone in the patient's head, but to fill up the defect with something that will take the place of what was lost and correct the deformity. In the skull, evidently conditions are better than in the face, although the skull does not reform bones as do other bones of the body. After fractures of the skull we do not have secondary callus formation, and we do not have in gaps of the skull much regeneration or replacement. A saddle nose, as Brown has suggested, is a different problem. It occurs in a syphilitic, and we know how hard it is sometimes to stop the progress of a necrosis which leads to saddle nose, and even with our best treatment we sometimes cannot arrest the process. A patient I know of has had twenty-six injections of salvarsan and yet retains a positive Wassermann. When we put in a dead substance in such patients we tax the tissues and there is considerable chance that the irritation will do harm.

The same condition obtains when we transplant from the rib, from the costal cartilage, or from the tibia. Some transplants are retained, and some are expelled; and we think it likely, in answer to Brown's question, that some of these bits of dead bone that we put in will likewise be absorbed, if they are not expelled; and yet the fact that we have retained, for two years, in one of our patients, a mass which appears to be bone, makes us feel that this is worth trying.

In none of the cases in which we have implanted have we observed any serious trouble. The tissue about the cornea gives us the least trouble. It is relatively elastic; it is the firm tissue over the bridge of the nose that gives us more trouble. We have difficulty in raising it up to the point where it should be, if we separate the tissues from the nose and cheek.

THE RESECTION OF LOBES OF THE LUNG*

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Large portions of the lung may be removed from the normal animal with ease and without danger. This is by no means true in case of the sick man afflicted with chronic pulmonary disease. He is generally septic, his resistance is low, his bronchial tree is flooded with a profuse purulent secretion. He is moderately cyanotic. His blood color is low. The diseased lung lobes are firmly adherent to each other and to the diaphragm and the pericardium. The hilum of each lobe is inaccessible. The main lobe bronchus is generally thickened and diseased and unadapted to the technic of closure so successful in animals. The respiratory function and more particularly the circulatory mechanism are distinctly upset by operations for lung resection. The right heart labors in the early postoperative stage to adapt itself to the added demands on the pulmonary circulation. The sound lung labors to accomplish the work of two. This it cannot do when the embarrassed right ventricle fails to supply it with blood to be oxygenated. At best the convalescence following operation is both hectic and long. There is much suffering. The end-result may be only a partial cure. Later plastic operations are generally necessary to obliterate the pleural cavity and to repair bronchial leakage.

Let no man suppose, therefore, that removal of lobes of the lung is a trivial performance. Those of us who are pretentious enough to disclose our experiences in this regard do so more with apologies for our incompetence than with boasts of our success.

The indications for lobectomy are few, but these must be specific. Chronic, nontuberculous lung abscess and bronchiectasis are at the present writing the only diseases to which such radical procedure should be applied, and then only in selected instances.

One lung must be absolutely sound. The disease must be confined to one lobe, or at least one lobe and the adjacent portion of an adjoining lobe. There must be an absence of active tuberculosis. The heart

* From the Division of Surgery of the Mayo Clinic.
* Read before the Section on Surgery, General and Abdominal, at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

must be a normal one. There must be complete absence of any systemic or organic disease. The individual should be under 35 years of age, certainly not over 45. There must be evidence that all nonoperative methods have failed or are obviously bound to fail. There should be ample evidence that the existing pulmonary infection is not one that might be cured or relieved by direct drainage of the lung.

Given a young adult patient with chronic abscess or bronchiectasis confined to one or one and one half lobes of one lung, whose resistance is not too low and in whom palliative treatment or drainage operations would obviously fail, lung resection may be considered. Nor should the patient be kept in ignorance of the dangers and discomfort associated with the procedure which you may propose to undertake. If all indications have been carefully studied and verified, the patient may properly be instructed that he may entertain no hope of cure without operation; that his existence will be a lingering and disgustingly offensive one both to himself and his associates; and that this existence will be of comparatively brief duration. Then it must be explained that the chances of relief or cure by the surgical alternative are between 60 and 70 per cent. If when thus informed the patient decides, after due consideration, to undergo operation, lung resection is justifiable.

I have employed a different technic in lung resection from that which we have all adopted in animals, and different from that employed in man by other surgeons. It consists in a several-stage operation with a multiple rib-resection exposure rather than a single operation with a wide intercostal exposure. I have argued that the division into stages reduces the insult to the respiratory and circulatory systems; that the intrapleural pressure is more gradually altered and the pulmonary circulation less suddenly overworked in the several-stage rib-resection method than in the single operation through an intercostal opening. I have been of the opinion that while these disturbances are equally well cared for during operation, the dangers associated with them in the first twenty-four hours after operation by the one-stage method are obviated by the several-stage operation.

FIRST STAGE

Neither differential pressure nor intratracheal insufflation has been used in this series, nor has their omission been regretted. The incision is crescentic, with its convexity downward, starting at the fifth rib two inches from the vertebral column, crossing the eighth rib in the scapular line, and terminating at the level of the sixth rib in the mammary line.

The skin and fat are dissected upward from the muscle for an inch. Vessels are clamped and tied. The latissimus muscle fibers are separated vertically to admit long-bladed curved muscle clamps, which are applied in series above and below in the direction of the sternum and again toward the vertebral end of the wound. The muscle fibers are then divided transversely between the clamps.

The field thus exposed should permit the subperiosteal resection of the seventh, eighth, and ninth ribs from their angles to the anterior axillary line. The intercostal bundles are then ligated and removed. The skin and muscle flap is then replaced. The wound is closed tight. The thoracic window has been made ready to open. The chest-wall collapse necessary for the subsequent obliteration of the space left after amputation of the lower lobe is provided. Something has been learned of the individual's resistance to surgical trauma, and of his tolerance of anesthesia.

SECOND STAGE

The interval prior to the second stage should be approximately a week in length. The power of expelling sputum should have been restored; all trace of shock should have disappeared; and the temperature should approach "normal."

The skin stitches are removed, the scapula and flaps retracted, and the pleura again inspected. It will be found that in the upper part of the exposed field there are new pleural adhesions anchoring the upper lobe. The lower lobe is still adherent at various places, now somewhat retracted and purple red in color. The pleura is opened wide at any point whether adherent or not. There will be no particular change in respiration or pulse.

The separating of adhesions necessary to deliver the lower lobe is generally irksome. It is the difficult part of the operation. The lower lobe is generally bound to the diaphragm and costodiaphragmatic angle by tough, unyielding bands which may not yield under digital pressure. If undue force is used in stripping, the lung surface will tear before the adhesion gives way. Some of these should be cut. It is well, therefore, to free the lobe first from all except its diaphragmatic attachments, so that if bleeding occurs during the separation of the latter a clamp may be applied temporarily in the region of the lobe hilum. The interlobar fissure does not always provide a simple cleavage, nor is it advisable to employ too much force in this region lest the light adhesions be parted which by now should be holding the upper or middle lobes to the parietes. The pericardial surface is least troublesome of all.

To stop the operation at the middle of the second stage and to defer the completion of adhesion-stripping and the amputation to a third stage is a conservative measure not to be regretted, and one which in difficult cases may save the patient from undue hemorrhage, shock, and carbon dioxid poisoning.

AMPUTATION

If there has been no occasion to close the second stage prior to the complete delivery of the lower lobe, amputation is promptly performed as follows: A long curved clamp is applied to the root and closed to the last notch. The lobe is then amputated at least a half inch distal to the clamp. The veins, arteries and bronchi are then picked up separately and ligated with No. 2 chromic catgut. A mass ligature of kangaroo tendon or braided silk is then placed just proximal to the clamp and tied as the clamp is slowly released, the ligature being guided into the crushed area evacuated by the clamp. Not infrequently two clamps are necessary safely to include the whole stump. It is apparently an equally satisfactory method to leave the root clamps in situ and to remove them on the seventh day.

Both of these methods of amputation result invariably in subsequent leakage of the bronchial stump. The portion distal to the mass ligature or clamps sloughs away within a week or ten days, leaving one, two or three fistulous openings of small caliber. Experience will prove whether or not it is expedient to attempt any special technic for hermetically closing the bronchus at the time of amputation. The

bronchus at the point of division is generally dilated; its walls are thick, tough, and unyielding. It is probably not amenable to such treatment as invagination and end-suturing, which has been successful in normal animals. If treatment of this kind were attempted it would necessitate the isolation of the bronchus from the vessels in the hilum, the individual double ligation of the vessels before their division, and the crushing, division, cauterization, invagination, and suturing of the bronchus. Neither the clamp nor mass ligation could be employed. In the present period of undeveloped surgery of the diseased lung it would seem more proper not to sacrifice time at the end of a critical operation by any finesse in the treatment of the bronchial stump, which in its pathologic condition would stubbornly resist any technic of closure.

The minute fistulas consequent on the clamp and mass ligature technic in no way complicate the convalescence. The pleural space is rapidly obliterated, the fistulas remaining the only unhealed points in the wound. By local plastic surgery under local anesthesia the fistulas are closed later by the superimposing of a skin-and-fat flap.

The after-treatment of the second operation is simple. Bronchial secretion is no longer a cause of anxiety. Within the first two days the bronchial tree becomes free from the residue emptied into it from the lower lobe just previous to its removal.

With return of consciousness the patient discovers that the promised reward of his long siege of treatment is now a reality. The sudden freedom from a cough of perhaps ten years' duration is a stimulus mentally and a boon physically.

The pack is not disturbed for four days, by which time it is foul. At least two thirds of it can then be removed painlessly. When firmly adherent to the raw surfaces of the parietal pleura, fragments of the gauze should be left till they have sloughed away. Again, precaution is taken at each dressing to repack the persisting pleural space completely lest pocketing occur in the costodiaphragmatic angle or about the pericardium or posteriorly below the lower limits of the neighboring lobe. At no time in the convalescence should drainage-tubes be substituted for gauze. The skin opening has been so designed that it will not close until the cavity is obliterated. Irrigation is never indicated. Granulations may be stimulated with balsam of Peru. The pleural space remaining after excision of the lower lobe, having been already diminished by the shrinkage of fibrosis attendant on the first two stages, may now be obliterated within four months. The patient meanwhile attains a body weight equal to his previous maximum, and this continues to increase rapidly during the months following closure of the wound.

ABSTRACT OF DISCUSSION

DR. HOWARD LILIENTHAL, New York: My operations have not been performed by the method which Dr. Robinson has described, although after a talk with him I was sufficiently convinced of the desirability of the principle of preliminary lung fixation by artificial adhesion to the costal pleura that in three cases I attempted a modification of his method. In only one of the three was I able to carry out both steps, and this patient died of sepsis ten days after the second operation. These cases will all be reported at a later date.

In speaking of the operations for lung abscess, I refer here only to those in which an attempt was made to extirpate the diseased lobe. In my first seven cases, operated on by the one stage method, four patients were cured and have remained well.

It is conceded that nothing short of resection will actually cure these patients. Drainage operations are usually futile, and at best are followed by more or less improvement, but not by cure. I believe that the one stage method has the great advantage of doing away at once with the pus-forming focus so that the danger of postoperative pneumonia on account of the inability of the patient to cough up the purulent secretion is minimized. By operating between the ribs, with or without additional rib section—but not resection—to gain sufficient room, the contour of the chest is not disturbed and such deformity as exists is invisible without the use of the Roentgen ray, because instead of the filling in of the dead space by collapsed areas of the chest wall, the space is filled in by the rising of the abdominal viscera which push the diaphragm into the thoracic cavity. We therefore have a resulting symmetry of the skeletal parts and the functions of the chest more nearly approach the normal than they can after a multiple rib resection.

The method which I adopted in trying to secure a safe two-stage operation was to make a long intercostal incision, separate the ribs, paint the surfaces of the visceral pleura covering the healthy part of the lung and the adjacent parietal pleura with tincture of iodin. Then expanding the lungs with intrapharyngeal pressure, the chest wound is closed by suture. In one of my cases, the only one in which it was possible to perform the second stage, I found good adhesions, so that on opening the chest for the second stage there was no collapse of the lung. I could then resect the lobe, the right upper one, with very little shock; but unfortunately a serious local infection occurred and the patient finally died of pneumonia of the opposite lung.

In a suitable case I shall be glad to try this plan again. At the same time I must say that my best successes, four cures in seven cases, followed the one-stage operation performed through an intercostal space without rib resection. Two of these patients had their right lower lobes resected and two the middle lobes. Another patient who is convalescent after nearly two months, but who still has a large cavity to be obliterated later on, survives after the extirpation in one stage of the right lower and middle lobes. This patient developed an anaerobic infection after his operation and was near death's door. For forty-eight hours I permitted a slow stream of oxygen gas to flow through his thoracic cavity and the anaerobic infection was overcome.

The principal differences, then, between Dr. Robinson's method and my own are, first, that I prefer not to resect ribs but to operate between them; second, by removing the suppurating focus at the first stage, the cough at once ceases and the danger of pneumonia from that source is overcome.

DR. WILLY MEYER, New York: One of the principal points brought out by Dr. Robinson is the careful selection of these cases for operation. Unilateral bronchiectasis of one lower lobe certainly is the most favorable for extirpation. Among my five cases of attempted lobectomy, only one, the first, had inferior lobe affection (1910); in two, both lobes (left lung) were involved; in two others the upper lobe alone was diseased.

In animal experimentation lobectomy is simple. The lobes are differentiated and easily pedicled. The bronchial stump, after crushing, can be inverted and safely stitched. We saved seventeen of twenty-one dogs thus operated on. The lobes of the inflamed human lung form a unit. One cannot so easily get into the interlobar space. Pathologic conditions render isolation of the bronchus and ligation of the concomitant vessels unsafe and impracticable. We must therefore treat the pedicle of the lung, as, for instance, that of a suppurating kidney, namely ligate it *"en masse,"* and provide for the reopening of the bronchus stump in after-treatment.

Dr. Robinson spoke principally of operations in advanced cases. I would say a word on the treatment of earlier cases. Bronchiectasis usually follows pneumonia and aspiration of blood (tonsillectomy, adenoids). In one case of the latter type (girl), all lobes of one side were affected. Regular irrigation of its bronchial system brought great improvement

(Yankauer). In two cases pneumotomy brought permanent relief. After incision we could see the irregular bronchial distention, which the finger tip palpated. Increased ventilation of these cavities can do away with the very foul odor (three observations). Irrigation with oxygen assists.

In advanced cases the stage operation may have advantage. I tried it once, the entire left lung being involved. Aspiration pneumonia took the patient's life on the third day. Surgeons interested in this subject should have a large amount of material to select from. Evolution would then be quicker.

Two methods seem destined to improve results: thoracotomy under regional anesthesia and postoperative drainage. Regarding the latter, Kenyon's method seems best. In one of my cases (two-stage operation), more than two quarts drained off in sixty hours. We are just trying to develop its technic for the various types of intrathoracic operations (six cases).

It seems wise to enter the thorax without a fixed program. Findings must dictate the required operation as in abdominal surgery. Conservative surgery can bring great relief, when radical surgery may take the patient's life.

DR. SAMUEL ROBINSON, Rochester, Minn.: It is a great consolation to find that I am laboring over a subject in harmony with others who are struggling with the same obstacles, and I have been most fortunate in finding both Dr. Willy Meyer and Dr. Lilienthal cordially cooperative in their attitude. They are quite as willing to make certain departures from a fixed intercostal technic as I am ready to abandon any one of the features in the several-stage rib-section technic which I have employed, provided by such compromises we can collectively reduce the mortality in these serious operations.

Dr. Lilienthal has just stated that he has performed nine lung resections with four deaths, a mortality of 45 per cent. My own series includes seven resections with three deaths, a mortality of 43 per cent. From these confessions two things are obvious. First, that the mortality is high, and second, that the technic of either one method or the other must be materially changed before any degree of perfection is reached. In fact, it is my opinion that we shall eventually adopt some entirely new feature in technic.

I am conducting a series of experiments to discover the most suitable method of artificially producing adhesions of that portion of the lung which is not to be removed. I am employing different astringents for this purpose, injecting them at various points through the tissues of the thoracic wall. If one lobe can thus be anchored so that it remains in position during resection of the other lobe or lobes, the chief obstacles to successful lobectomy will be removed.

Diet in Typhoid and Paratyphoid Fevers.—In a recent work on typhoid Vincent and Muratet state that in France milk is the great reliance in feeding typhoid and paratyphoid patients. The milk is always boiled for ten minutes at least, giving up to 2 liters with at least 2 liters of other fluid. The milk can be given hot or cold, and flavored with tea, coffee, brandy or rum, vanilla, orange flower water, or a drop of oil of anise to a cup of milk, or the milk can be made acid or effervescent. In case of absolute intolerance for milk, kefir or koumiss may be substituted, or a strained vegetable broth or gruel. For the latter they use a mixture of a tablespoonful each of barley, wheat, crushed corn and hulled beans, peas and lentils, boiled for three hours in 3 liters of water, salted and strained. Every hour or half hour a glass or half glass should be given of weak tea, coffee, lemonade with or without wine, or weak diuretic decoctions (dandelion, licorice, cherry stems). To avoid fermentation these drinks should not be much sweetened; lactose can be used, on account of its diuretic action, instead of sugar. The patient should drink often, but little at a time and slowly. Robin gives, in addition to the above, a liter of chicken or veal broth in the twenty-four hours. Chantemesse prefers to give two or three tablespoonfuls of meat juice, the amount that can be squeezed from 200 gm. of chopped meat. The first solid food allowed is a light tapioca.

THE POSSIBLE APPLICATION OF THE MACROSCOPIC SLIDE AGGLUTINATION IN THE SEARCH FOR MENINGOCOCCUS CARRIERS *

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The methods at present employed — the streaking of plates to obtain discrete colonies, the subculturing of suspicious colonies and the examination of these cultures in smear with the Gram stain and the determination of their agglutinative properties in one or more serums — as well as further subcultures, as frequently done, to determine the fermentative reaction of suspected strains, makes the examination of many carrier suspects extremely laborious. The removal of the necessity of any one of the latter steps would result in a great saving of time, labor and materials.

In the methods we employ for typhoid-paratyphoid identification of suspected colonies from feces, the use of the macroscopic slide agglutination has been such a time saving procedure that we were led to try this method with meningococcus colonies on plates and with the growth on slant agar mediums. With sufficiently developed colonies or with traces of growth from slant mediums, a prompt agglutination results with the curative serums obtained from the horse, found by previous tests to have a high content of agglutinins, that is, a high titer and a broad range of action on various representative strains.

Two such serums have been tested with a 1 : 10 dilution of normal horse serum as a control and a 1 : 10 dilution of the immune serums for agglutination. Both immune serums gave immediate agglutination with over sixty strains, representative of the great majority of strains likely to be encountered. In a few instances out of the total number of cultures, slight clumping was present in the control normal serum; but this was not due to the serum, as the same result was noted with saline solution. In fact, eight other normal horse serums showed no action on six representative strains when used in a dilution of 1 : 10.

Even in these instances, in which slight clumping occurred in the control, the immune serum result was so marked as to leave no question as to the specific agglutination of the meningococci.

Higher dilutions were employed and fairly good results were obtained with a dilution of 1 : 25, although with some strains the size of the clumps was lessened and some delay in the reaction resulted. A 1 : 50 dilution gave in general unsatisfactory results. Naturally the dilution applicable would have to be determined for each serum by testing it against a series of representative strains. The method is to place a row of small drops of the dilution of the normal horse serum and another row of drops of the dilution of the immune serum, on a slide. The growth from the suspected colony or a trace from slant mediums is then taken up with a small loop and rubbed first in the normal and then in the immune serum without burning the loop between, till sufficient growth is rubbed off to give a slight turbidity. The reaction in the immune serum is evidenced by the immediate or prompt development of plain visible clumps.

The method is reported in this unfinished form because of its time and labor saving possibilities. It

*From Bureau of Laboratories, Department of Health, New York City.

has just begun to be used in the actual search for carriers. It seems a most promising method for the rapid survey of suspicious colonies or of subcultures or both.

As to subculture mediums, we have tried various carbohydrate combinations. Of these a serum-water agar containing 1 per cent. of lactose and 1 per cent. of saccharose and 1 per cent. of the Andrade indicator with the reaction set to this indicator seems to be the most promising for exclusion of the mouth cocci, the majority of which ferment one or both of these carbohydrates.

The applicability of the slide reaction as well as its value as a final identification method can be determined only in actual practice. Several factors will have to be determined: first, possible meningococcus strains not influenced by the serums used; second, the possibility of spontaneous agglutination among strains fresh from the human body, and third, false positive reactions due to the action of normal or group agglutinins on bacteria other than meningococci. If the case strains, however, are available and agglutinate well, this would raise a strong presumption that the strains from contacts which do not agglutinate could be excluded from consideration. Should a negative reaction be found reliable, but false positives be found, even then the time and labor saved would be very great. If the method is found to be of value, it is suggested that a central laboratory undertake to reserve for this purpose, serums showing the combination of the highest obtainable agglutinative titer as well as the widest possible strain range and have it available for call, labeled with dilution to be used. The amount required would not be large, as the dilutions need not be freshly made every day, and probably if kept in the refrigerator would remain fully active for a week or longer.

The serum drops with culture added, if allowed to dry, have as far as tried served as satisfactory smears for the Gram strain, thus avoiding the necessity of making extra smears for morphologic examination. It is probable that the agglutination result could be sufficiently checked by finding, on morphologic examination of the smear, typical gram-negative cocci showing the characteristic irregularity in size and intensity of staining ("autolysis") if a check is found necessary to exclude false reactions due to other bacteria.

Besides the application in identification, possibly the slide agglutination may find application as a simple method of testing the serum employed in treating a case against the case strain. This could be done within from eighteen to twenty-four hours of seeing the case and might serve not only as a check on the therapeutic action of the serum but might also give an easy method of determining the incidence of strains acted on by the serum, thus alining them with the standard strains employed in immunizing the horses. Should a strain not be influenced it might then with further experience indicate the advisability of obtaining other serums to select one showing such activity if procurable. A simple test would be more apt to result in the submission of aberrant strains so that they could be fully studied in relation to the problem of making the curative as effective as possible against the great majority if not all of the strains encountered.

NOTE ON PLATING MEDIUMS

Dr. William H. Park has just returned from Europe, and has brought a note from Gordon on a simple method for preparing a blood solution to be added to agar for growth enrichment. As this method is not included in the paper of Gordon, Hine and Flack,[1] he suggested that it be noted here. The blood is obtained under aseptic precautions by bleeding a rabbit from the carotid directly into 50 c.c. of 5 per cent. citrate in physiologic sodium chlorid solution. This is then diluted with physiologic sodium chlorid solution to give a content of 5 per cent. of rabbit's blood. Ether (10 per cent.) is then added and the whole shaken and allowed to sediment for twenty-four hours. The clear (hemolyzed blood) fluid is then drawn off and bottled, a little excess of ether being added to each bottle. Four c.c. of this blood is added to each bottle of agar after melting and cooling to 50 C. Each bottle of agar evidently means 200 c.c., as the reference quoted above states that this is the sized container of agar distributed from the central laboratory. Each time the bottle of blood is opened, a few drops of ether should be added before replacing the stopper. Of all the agar preparations used, that prepared from a trypsin broth from fresh ox hearts has been most satisfactory. The method of preparation is given by Gordon, Hine and Flack.[1]

SODIUM CITRATE BLOOD TRANSFUSION

A COMPARISON *

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The subject of blood transfusion has occupied the attention of medical men for a number of years and has been discussed at recent meetings of this association with increasing interest as the therapeutic importance of the procedure has become more generally recognized. Carried out at first only at rare intervals, and with fear and trepidation, because of its formidable operative difficulties, simplification of technic became the order of the day as the desirability of blood transfer from one individual to another became more apparent until, far from being an extraordinary procedure, blood transfusion has gradually become an everyday occurrence in the activities of most large hospitals.

Even so, until recently there remained difficulties in transfusion work of such nature that a high order of skill and a peculiar technical familiarity were required in order to achieve the best and most far-reaching results—and this in spite of the many brilliantly conceived and executed mechanical devices. Chief of these difficulties was the persistent tendency of the blood to clot, so that it came to be generally agreed that no method of transfusion could be finally satisfactory unless this element of coagulation should be entirely eliminated. Until the recent work of Hustin, Lewisohn, Weil and Agote, this desideratum seemed to be far in the future.

These workers, independently of each other, demonstrated that blood could be inhibited from coagulating for many hours, even as long as forty-eight hours, by mixing with it sodium citrate; and by animal experimentation, they further showed that if the dosage of the drug were carefully controlled, citrated

1. Gordon, M. H.; Hine, T. G. M., and Flack, M.: Cultural Requirements of Meningococcus, Brit. Med. Jour., 1916, **2**, 678; abstr., THE JOURNAL A. M. A., Dec. 23, 1916, p. 1972.

* Read before the Section on Surgery, General and Abdominal, at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

blood could safely be used for transfusion purposes. The fact that sodium citrate, and other chemicals, such as the oxalates, had long been known to scientists as possessing the property of retarding blood coagulation, detracts no whit from their work, since the drugs previously had been considered of such toxic nature as to render them unfit for human usage. I dare say that no set of experiments in recent years has been so productive of revolutionary changes in a single procedure and of more far-reaching results than have those of Dr. Lewisohn in which he worked out on animals the exact dose of sodium citrate that might be used with safety in carrying out blood transfusion in the human body.

But it was not sufficient to procure a noncoagulable blood. It was necessary to prove that citrated blood possessed powers of benefit equal to those of whole untreated blood, for by the time this new method had been developed, a sufficient number of successful whole blood transfusions had been recorded to give rise to reasonable demands for favorable results. Unfortunately, certain early misdirected applications of the new method ended disastrously, and cast a doubt on the method that retarded its adoption, but its inherent simplicity and many attractive features were sufficiently apparent to those most familiar with work of this nature to insure its ultimate general use.

To be able to remove blood from the veins of one individual and carry it in a flask to the bedside of another, many miles distant, maybe, and in a leisurely manner to introduce it into his veins with no more disturbance than would be required in giving ordinary intravenous salt solution, is no mean advantage. To be able to relieve the timid patient and the anxious relative from the necessity of going to the operating room and lying side-by-side while the blood of one flows or is syringed into the veins of the other is highly to be desired. What a boon it is to the patient, shocked and bleeding from any one of the various causes of hemorrhage, to receive into his veins life-saving blood without having to be moved from his bed or even turned! Are there any among us who have not seen certain of these unfortunates suddenly expire during transport, even in their beds, to the operating room? And in those instances of transfusion in septic conditions—of which typhoid fever is a type—the citrate method absolutely removes all possibility of infecting the donor. These and other minor advantages give to the method of sodium citrate blood transfusion a degree of elasticity not approached by any other. Even if the action of citrated blood were less beneficial than whole, untreated blood, these advantageous characteristics of the new method would be of important consideration, but we are additionally fortunate in being able to state that there is little if any difference at all. In making this assertion, which will be supported by definite case reports, I may be permitted to say that, having had a certain share in the present day development of blood transfusion and having devised certain instruments for the transfer of whole untreated blood, I have been, in the nature of things, a harsh critic of the sodium citrate method; but so convinced am I of its tremendous superiority over all others, that for the last year it has been my method of choice, and I have used it in practically every case that has come under my care.

If we eliminate errors of technic whereby an inexpert operator may add too small an amount of citrate to the volume of blood withdrawn, with the result that coagulation sets in before the blood can be given to the patient, there is only one unpleasant phase of citrate transfusion that is not so frequently encountered in dealing with whole blood; namely, the occurrence of a chill and fever following the blood introduction. In my experience a chill of an intensity varying from a slight sensation of cold to a terrific shivering and shaking occurs about twenty or thirty minutes after the blood introduction in about 22 per cent. of sodium citrate transfusions. During this reaction the temperature may abruptly rise as high as 104 or 105 F., and as abruptly fall to or below normal. The whole phenomenon is over in three or four hours, and the patient shows little or no ill effects from it. A few patients have been rather upset and nervous for a half day, but the majority have only the recollection of a bad hour or two. I have never seen more than a single chill after a transfusion, and I have never noticed the slightest harmful effect on the future course of the illness or the progress of the patient. Never has there been the slightest hemoglobinuria produced as a result of the chill. In practically every one of my cases most careful preliminary tests have been made by men peculiarly skilled in this work and perfectly matched donors have been selected with the purpose of avoiding this chill—all unavailing from this point of view. It occurs in spite of the tests, and, unless it is due to the chemical itself, its etiology is as obscure to me as its occurrence is without significance other than inconvenience to the patient. In this, then, the citrate transfusion differs from the whole blood transfusion, by which method my cases show that only 2 per cent. experience chills. The occurrence of this citrate chill, though, must not be regarded too seriously, since it must be remembered that the same phenomenon may follow the intravenous introduction of the ordinary isotonic salt solution.

The occurrence is unfortunate, especially because it cannot be predicted, and one can readily see good reasons for hesitating to subject a patient, shocked and almost moribund, to the possibility of an added trial of this nature. It has been suggested that an extremely slow introduction of the blood might avoid the chill by allowing the body time and opportunity to take up and eliminate the sodium citrate (the work of Salant and Wise would suggest this) but I have known it to follow after the slowest kind of transfusion, and fail to follow after an introduction of 500 c.c. of blood covering only seven minutes. Others have thought that the temperature of the blood may influence its occurrence but my experience fails to reveal any such cause. After I had watched a very ill patient recover without any untoward effect from the chill and had seen others escape it entirely, my early hesitancy to adopt the method disappeared and I now disregard this feature entirely. I really believe that even the extremely ill patients will not be harmed if it occurs, because it comes practically always after the transfusion is completed, and the dose of blood given will amply fortify them against the shocking effects of a possible chill. I have had only one case of chill during transfusion, and this does not offer a fair example, since it was an emergency of such dire necessity that preliminary tests could not be made. The chill, therefore, might have been due in part or altogether to blood incompatibilities.

My series of sodium citrate transfusions comprises forty-five consecutive cases and embraces a wide variety of conditions. The ages of the patients varied

from an infant of 8 days to a woman of 61 years, and both sexes had full representation, although the majority of patients were women. There were no deaths directly attributable to the transfusion, although death followed ten minutes after the blood introduction in one instance, and about an hour and half later in the two others. Two of the patients were unconscious and moribund at the time, and absolutely beyond the aid of transfusion or anything else, but, as occasionally happens in work of this nature, conditions peculiar to the case demanded measures of last resort even in the face of certain defeat. The first mentioned case was so hurried that blood tests could not be made. The second case was unavoidably delayed and the third patient died of hemorrhage in no way connected with the transfusion. In all other cases the beneficent influence of fresh citrated blood was as obvious as we were wont to experience when using whole untreated blood.

It might be thought that if sodium citrate prevents blood coagulation outside the body, a similar influence might be exerted in vivo and with disastrous results, but the contrary is the case. For example, late one night, I was called to see a little baby, 8 days old, who had had a ritual circumcision done some ten hours previously. There was a well-recognized family history of hemophilia, so after making every effort to stop the bleeding by ordinary surgical measures without success, I did a transfusion of 55 c.c. of citrated blood from father to child. In order to make doubly sure, I also dressed the child's penis in a gauze sponge soaked in the same citrated blood. The bleeding ceased immediately and the child made an uninterrupted recovery.

It has been well known, of course, that transfusion of whole blood usually acts as a specific in cases of this sort. It now appears that citrated blood is equally efficacious in the condition. But to illustrate its effectiveness in other states of active bleeding, I might say that in one case of bleeding gastric ulcer, and in another case of bleeding duodenal ulcer, a single citrate transfusion of 500 c.c. of blood in each instance effected a prompt and permanent cessation. Both patients were pouring out tremendous quantities of blood and were rapidly sinking at the time of the transfusion, six doses of horse serum having been administered to the patient with duodenal ulcer without the slightest beneficial effect. In still another form of active bleeding, in a most obscure case of a young girl apparently suffering from an intestinal type of purpura, a citrate transfusion returned to life an all but moribund patient. Her intestinal bleeding did not entirely cease, but the great outpourings of thin, watery blood were checked and a condition of hopefulness supervened on one of despair. Indeed, this case taught many lessons in the art of transfusion and afforded a rare opportunity to study the citrate method and to compare it with the whole blood method. Twelve transfusions in all were carried out on this patient during a period of three months—and with a most happy result. The first one, a citrate transfusion, did a tremendous amount of good, but we thought that subsequent citrate transfusions were not quite so effective. We tried whole untreated blood twice, but the results were no better so far as totally checking the bleeding was concerned, although the absence of chill was an advantage. However, since several of the citrate transfusions had been unaccompanied by this phenomenon, we felt justified in going back to this method, because of its greater ease of accomplishment.

This case will be reported in detail at another time in collaboration with Drs. Baetjer, Miller and Burnam, but it might be mentioned here that we had occasion to use a certain donor twice, both times by the citrate method, and were surprised to find that his blood gave rise to no reaction at all the first time, while a severe chill followed the second introduction. Equal amounts of blood were used both times, the technic was precisely the same in all details, and the patient's condition was about the same, although one transfusion had intervened between the two from this man, which were twelve days apart.

Aside from cases of actual bleeding, citrate transfusions have been used in several cases of secondary anemia with success equal to that of whole blood. One case was that of a woman, quite anemic from the prolonged gradual ooze of an ulcerated malignant growth of the uterus. Five hundred c.c. of citrated blood permitted her to withstand a radical operation without difficulty. Another instance was that of a man that had undergone a partial resection of the stomach for carcinoma. In bad condition before operation, his postoperative course was stormy, his abdominal wound broke open and showed no tendency to heal, he became progressively weaker, markedly anemic, and two weeks after operation was running a definite septic temperature. Unable to eat, dreadfully pale, his skin cold and clammy, hemoglobin registering but 22 per cent., this man presented the forlorn, despondent picture of one absolutely lost. Two transfusions of citrated blood at eight day intervals brought about a marked improvement, and the man walked out of the ward within three weeks able once again to take up his daily activities. In still another case, a citrate transfusion prior to and during operation permitted the removal of a ruptured kidney from a little boy who had been almost exsanguinated by the torn organ.

Quite recently, an unusual opportunity to compare the efficacy of whole blood and citrated blood presented itself. The case was that of a woman suffering from pernicious anemia, who had undergone early in 1916 three transfusions of whole blood and a splenectomy. She had left the hospital in very good condition and continued to be well for about eight months, when a relapse had set in. Unwilling to take the advice of her physician and have a supportive dose of blood, she gradually lost ground until she had a blood count of 1,331,000 red cells and 25 per cent. hemoglobin, at which time she consented to a transfusion. Having had experience with the whole blood method, she insisted that this should be used. She was given 500 c.c. of blood, and the count made two days later revealed 2,080,000 red cells and 35 per cent. hemoglobin.

I then persuaded her to permit me to use the citrate method for the second transfusion, which was done three days after the first, 500 c.c. of blood being given without the slightest sign of a chill or other discomfort. Three days later her count was 2,450,800 red cells and 45 per cent. hemoglobin, and a few days after this her red cells registered so high (3,700,000 and hemoglobin 55 per cent.) that the resident physician ordered the count verified. This case (and I have had others of a like nature) therefore demonstrates that citrated blood exerts as much influence on the blood forming organs as does whole blood.

I could cite details of other cases, but they would be only a rehearsal of those already mentioned. The upbuilding process in pernicious anemia is just as efficiently started by this method as by the whole blood; the combating of immediate postoperative hemorrhage and shock is likewise successfully carried out, and all cases are handled with surprisingly little discomfort to the patient. It is not even necessary for the patient to know that he is receiving blood (since a towel can be wrapped around the containing flask leaving the impression that the ordinary intravenous salt solution is being given. Finally, I have used citrated blood in amounts exactly corresponding to whole blood transfusions, the exact amount in a given case depending solely on the age of the patient, his condition, the amount of blood lost (if in a hemorrhage) and the purpose of the transfusion. The smallest amount given has been 55 c.c. to an infant 10 days old, the largest 1,000 c.c. to a woman exsanguinated from uncontrollable uterine bleeding. In several instances, with the patient under ether I have slowly injected sufficient blood to carry him through operation. And just recently I gave two transfusions to a little 22-month-old boy who was unconscious and thought to be dying from an anemia consequent on an unusually septic pneumonic process. The transfusions were given two days apart, the dose of the first being 140 c.c. and that of the second, 220 c.c., a tremendous dose for so young a child. No chill or other disturbance resulted from either transfusion, and the child was tided over an unusually critical period of his illness.

I, therefore, feel that a careful consideration of the foregoing pages will convince even the most skeptical that a tremendous advance was made when the method of sodium citrate blood transfusion became a reality. And those workers who had a share in perfecting it—Drs. Hustin, Weil, Argote, and especially Dr. Lewisohn—deserve the thanks and congratulations of us all.

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ABSTRACT OF DISCUSSION

DR. GEORGE I. MILLER, Brooklyn: Blood transfusion has passed the stage of infancy. It is of little importance today which method one employs to perform transfusion as long as he is able to perform the operation with ease, with accuracy and with safety to the patient. The physician who is called on to perform transfusion may well use his judgment and determine which method will be more convenient. He will surely be doing justice if he will discard all instruments in existence and resort to anticoagulation drugs for the purpose of preventing coagulation and in the hope of preventing operation. He may also be able to perform a blood transfusion by adding normal saline, equal parts, to any given quantity of blood and thereby prevent coagulation. Circumstances, however, may suggest different methods at different times. While anticoagulation drugs may be procured, prepared and then transfused in an institution, in the operating room or even in the patient's home, instruments for the transfusion can be used at all times and in every emergency, even in the highways in the country, on the farm, on the battlefield, in the trenches, wherever an emergency presents itself. I have performed 133 transfusions on 78 patients. Of these, 34 were for traumatic hemorrhages; from the kidney in 3; ruptured ectopic pregnancy in 2; postpartum hemorrhage in 4; placenta praevia in 3; excessive bleeding from hemorrhoids, 3; postoperative and intestinal hemorrhage, 4; gastric ulcer, 6; ruptured varicose ulcer of the leg, 1; hemophilia, 5; fibroids, 2; pulmonary hemorrhages, 1. Of the chronic cases, I have transfused for recurrent epistaxis, 4; purpura hemorrhagica, 5; psoriasis, 1; carcinoma of the breast, carcinoma of the uterus, preoperative carcinoma of the stomach, carcinoma of the eye, abdominal carcinomatosis, 1 of each; lymphosarcoma, 2; postpartum sepsis, 4; postabortive sepsis, 5; ulcerative endocarditis, 1; chronic furunculosis, 3; Banti's splenomegaly, 1; advanced simple anemia, 14; pernicious anemia, 40; postoperative shock, 4; cholemia, 1; melena neonatorum, 1; postoperative sepsis, 1; asthenia, 1; lymphatic leukemia, 2; hydatid mole, 2. I have had favorable results in these 78 cases. Of these there were 15 cases in which the outlook for recovery was poor and transfusion saved the patients' lives; 23 were cured, the lives of 20 were prolonged, and 20 died. I have used my own special method. I have devised two instruments; one is known as a valve and the other as a shuttle. The valve consists of two arms with rubber tubing and a stem. The stem of this instrument I attach to an ordinary record syringe used for salvarsan injections and by means of my special cannula, which I introduce into the vein of the donor, and couple to the arm of the valve, fill the syringe with blood, turn the lever and empty it into the empty vein of the patient. Having emptied the syringe, I come back to the arm of the donor, refill the syringe and take the desired quantity of blood. The second instrument is made on the same principle, except that it has no lever to turn back and forth, but the syringe goes back and forth from one arm to the other. I introduce the arm of the instrument into the vein of the donor, fill the syringe with blood and permit the syringe to move it instead of a lever, and empty it into the vein of the patient. I use a 100 c.c. record syringe. By going back and forth I get the desired quantity of blood. I have transfused 133 times with no bad results, without chill, without exposing the blood to the air, without paraffin, boiling the instrument the same as any other, and have not found it necessary to resort to any other method.

DR. RICHARD LEWISOHN, New York: It is rather surprising that sodium citrate, which has been used extensively as an anticoagulent in laboratory work, had never been made use of before for human blood transfusion. According to the textbooks on pharmacology, it requires at least a 1 per cent. mixture of sodium citrate to prevent coagulation of the blood. My experiments show that 0.2 per cent. is sufficient to prevent clotting, and furthermore, that if a 1 per cent. mixture is used in large transfusions, the clinical results will be most alarming and possibly fatal. These two new observations have put the citrate method of blood transfusion on a safe clinical basis. It should be our aim in surgery to simplify the technic as much as possible, if the simplified methods give us the same clinical results as the more complicated ones. There can be no doubt that the citrate method is technically much simpler than any of the other methods. Furthermore, this new method makes blood transfusion applicable in a number of diseases in which the other methods (vessel anastomosis, syringe and stopcock methods) could not be used on account of the risk for the donor (bacteremia, typhoid, etc.). Extensive experience has shown that citrated blood is clinically as efficient as unmixed blood, even in hemorrhagic diseases. Furthermore, citrated blood, within the limits mentioned above, is absolutely atoxic. I have repeatedly used rather large quantities of citrated blood in new-born infants suffering from melena neonatorum, omphalitis neonatorum, etc. The bleeding stopped immediately and the babies did not show even the slightest reaction. My records include 130 cases; of these, 15 per cent. had a chill following the transfusion. We encountered chills following the infusion of citrated blood somewhat more frequently than with the other methods (Unger about 5 per cent., Lindeman 10 per cent.). I do not think that the addition of sodium citrate to the blood accounts for the chills. They are probably caused by the chilling of the blood during the transfer from donor to recipient. I intend to use a thermos bottle of special construction in place of an ordinary glass jar, and hope thus to reduce the percentage of chills.

DR. J. BION BOGART, Brooklyn: Dr. Miller happens to be my associate at the Jewish Hospital and many of his transfusions have been done in my service and I have been a witness to them. If you hear an operator talk, his method seems easier than when you see it done. Now the Miller

method is just as easy as it looked when Dr. Miller demonstrated it here by drawing water into the syringe and changing from one receptacle to another. I want to take issue with the statement made by Dr. Lewisohn that there is no doubt that the citrate method is the simplest of all methods. I have the greatest admiration for Dr. Lewisohn and his method and I would be the last one to take exception to anything that might be said so long as it was true; but I am satisfied from having seen a large number of these transfusions that the Miller method is quite as simple and I believe I might truthfully say it is simpler than the citrate method. Any one who can introduce the cannula, use a syringe and turn the valve can make the transfusion. You saw the little box which Dr. Miller brought—about 4 inches long, 2 inches wide and 1½ inches deep. That is all you need. The donor has to be examined in the same way in both cases.

This matter of blood transfusion has reached a point at which there is no longer any discussion about its usefulness. Its field is widening all the time. I think it has reached the point as to which is the simplest method—simply a question of which can be done the easiest, and which all may be able to do; and I would advise every one of you before leaving this meeting to take in your hands the Miller valve and make the experiment of transferring water from one vessel to another with it. I think that will convince you that the Lewisohn method is not the easiest. My own judgment is that there are only two methods, the Miller method and the method by the citrated blood.

DR. J. SHELTON HORSLEY, Richmond, Va.: I regard the work of Dr. Lewisohn on transfusion as second in importance only to that of Crile and Carrel. Any surgical operation that is converted from a complicated technic into a simple procedure is the ideal in surgery, and this is what Dr. Lewisohn has done. He has taken an operation that is sometimes urgently necessary, and also a very complicated one as done according to the earlier technic, and converted it into such a simple thing that any one can do it. I confess I was somewhat skeptical about this method when it first appeared, but I have been converted by the results that have been shown.

There are some interesting features connected with the citrate method, however, that have not been explained and may have no practical bearing. We know that, according to Lewisohn, a 0.2 per cent. solution of citrate of soda will prevent blood from coagulating from one to two days, but when this citrated blood is introduced, the coagulation time of the patient's blood is always shortened. This shows that there is some product of injured cells released by the citrate method that formerly was not present. Thrombokinase, or some similar product that results from injured platelets or blood cells, is undoubtedly produced, for otherwise the coagulation time would not be shortened. It would be interesting to know just what happens to cause this phenomenon.

Comparatively little is known about the chemical changes in blood. Physiologic chemists are not agreed about so gross a process as coagulation. It is reasonable to suppose that some other changes that cannot now be detected occur in blood that is not performing its normal physiologic function. The turning loose of cell products by the citrated blood is an evidence that the material introduced is not the same as the blood would be if carried directly along a continuous channel of vascular endothelium, as in the direct suture method of transfusion. Clinically, however, these changes from citrated blood that tend to shorten the time of coagulation of the patient's blood, seem to be of no importance if the technic of Lewisohn is adopted. If the results are practically the same, the simpler method, of course, should be adopted.

DR. BERTRAM M. BERNHEIM, Baltimore: It must be nice to have Dr. Bogart say for one, "If you come down to the Jewish Hospital, we will show you." If you come to Baltimore, if you go to Mt. Sinai, if you go to Chicago, you can see still other methods; and if you go to Brown you will also see an instrument there which works perfectly, but they are all for whole blood and will not do. I sympathize with Dr. Miller because I devised two instruments myself. All my work is surgical. I hated to see the whole blood method go, because the citrated method introduced a tremendous amount of competition not encountered before. And thereby hangs a tale. The medical men have taken up citrate transfusion. The citrate method is open to all; but few can do a hurried, whole blood, emergency transfusion. I have done transfusing in a blacksmith shop when there was no other way. I have crawled up on the bed and transfused people, but I was pretty skilled in doing that transfusion, and have seen others try to do it and fail, even in a well equipped operating room. If one is going to use these instruments we have heard about, one has to use syringes. Dr. Miller's remarks were beside the point. This is neither the time nor place to demonstrate instruments. The subject under discussion was citrated transfusion as compared to whole blood transfusion. It cannot be denied, if one considers the matter, that the citrate method is the simpler. One must admit there is a great advantage in dealing with only one patient. In citrate transfusion the blood is taken from the donor and may be administered in New York, Baltimore or Chicago. It can be carried in a flask! Instruments are bad and must be relegated to the scrap heap.

STUDIES ON THE CAUSE AND THE TREATMENT OF BRONCHIAL ASTHMA *

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During the past two years at the Peter Bent Brigham Hospital, we have been investigating the cause of bronchial asthma and our study of its causation has led to a consideration also of the treatment of this disease. Because of the close relationship between the symptoms of bronchial asthma in man and those of anaphylaxis in animals, we have been interested chiefly in the part played by protein sensitization as a cause of bronchial asthma. A few words will outline the pioneer observations which have linked together the symptoms of these two conditions.

The earliest observation having direct bearing on protein anaphylaxis is found in the writings of Magendie in 1839. He describes the sudden death of dogs which had been repeatedly injected with egg albumin. The next observation was in 1894 by Flexner, who noted that animals would succumb to a second dose of dog serum if some days or weeks were allowed to elapse between the first and the second injections. Richet in 1902 made a systematic study of this problem and found that the first dose of protein was followed by a condition of markedly greater susceptibility to the protein. He called this phenomenon anaphylaxis to express its antithesis to prophylaxis or protective effects. As a result of many other investigators from this time on we now know that, when a specific antigen (a protein in the case of asthma and anaphylaxis) meets its antibody, the reaction between them gives rise to a toxic product and this causes the characteristic symptoms known as anaphylactic shock. In 1910 Meltzer pointed out that in both bronchial asthma and anaphylaxis the symptoms consist in a tonic stenosis of the small bronchioles and that both conditions are favorably affected by the administration of atropin.

From the work of many investigators we now know a considerable amount about anaphylactic shock in

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animals. In our study of bronchial asthma we have been able to show to a certain extent that a similar type of anaphylactic shock plays a rôle in asthma in man. If a bronchial asthmatic who is sensitive to some protein be injected subcutaneously with a small amount of this protein, he will have shortly an attack of bronchial asthma. He has difficulty in expiring, but at first no difficulty in inspiring. Later, as the lungs become overdistended, there is difficulty also in inspiration. If the patient is examined with the fluoroscope at the time when he is struggling for breath, we find that the lungs do not expand and that the diaphragm is stationary. Immediately following an injection of epinephrin chlorid, however, the lungs are seen to expand, the diaphragm moves up and down with respiration, and the patient's dyspnea abates. Furthermore, an analysis of the patient's alveolar air during the paroxysm of difficult breathing shows that the alveolar air has a low carbon dioxid content, although the blood at the same time shows a normal carbon dioxid content. Following the injection of epinephrin chlorid, which relieves the difficult breathing, the carbon dioxid content of the alveolar air gradually returns to the level of that in the blood. Thus attacks of bronchial asthma and anaphylactic shock are similar, in that both may be caused by proteins, and the symptoms are similar, in that there is labored respiration. Pathologically, the two conditions are alike, in that there is distention of the lungs, and furthermore in animals there is a stenosis of the bronchioles, and in the human body there is evidence of this from the carbon dioxid content of the alveolar air. And lastly both conditions are relieved by injections of epinephrin chlorid.

We have used the cutaneous or skin test to demonstrate what protein might be the cause of bronchial asthma. A number of small cuts, each about an eighth of an inch long, are made on the flexor surfaces of the forearm. These cuts are made with a sharp scalpel, but are not deep enough to draw blood, although they do penetrate the skin. On each cut is placed a protein and to it is added a drop of tenth normal sodium hydroxid solution to dissolve the protein and to permit of its rapid absorption. At the end of a half hour the proteins are washed off and the reactions are noted, always comparing the inoculated cuts with normal controls on which no protein was placed. A positive reaction consists of a raised white elevation or urticarial wheal surrounding the cut. The smallest reaction that we call positive must measure 0.5 cm. in diameter. All larger reactions are noted by a series of plus marks and any smaller reaction is called doubtful. As evidence that the skin test is satisfactory and conservative we have found by treatment with subcutaneous injections of proteins that we cannot inject a patient with a stronger solution of a protein than that which gave a positive reaction without producing an attack of asthma. For the preparation of the proteins that we use in the skin test, I will refer you to the series of papers that have already been published.

In this paper we have limited our study to the first 150 patients, because all of these were studied during one complete year, from May to May. Thus, each season is represented once and a fair series of cases result. Of this series of 150 cases, eighty-three, or 55 per cent., were sensitive to some protein. The horse was chiefly responsible for bronchial asthma in this group in 20 per cent. of the cases, the wheat proteins, *Staphylococcus pyogenes-aureus* and the early pollens were each responsible for asthma in 15 per cent. of the cases, the late pollens in 10 per cent., the cat in 5 per cent., *Staphylococcus pyogenes-albus* in 3 per cent., a group of miscellaneous proteins in 7 per cent., and in the remaining 10 per cent. of these cases several proteins were the cause of asthma. These percentages are not absolutely accurate, because so many patients were sensitive to more than one protein, but the percentages do represent the chief offender as nearly as it is possible to do so. Thus, it is seen that in our cases, the horse was the cause of asthma in the largest number of patients, that the wheat proteins, *Staphylococcus pyogenes-aureus*, and the pollens were close seconds, and that the cat and *Staphylococcus pyogenes-albus* were poor thirds. Of the miscellaneous proteins, one patient was sensitive to casein, one to egg, two to chicken meat, one to feathers and one to flaxseed.

A few words seem necessary in regard to multiple sensitization, or sensitization to more than one protein. We have found that most of the patients that are very sensitive to the proteins in horse dandruff are somewhat sensitive to the proteins in cat and dog hair. The same patient is not equally sensitive to the individual proteins found in the same type of animal hair. Only 20 per cent. of those patients that were sensitive to horse dandruff were also sensitive to the whole horse serum protein, so that a very small percentage of asthmatics are sensitive to horse serum and the danger of injecting an asthmatic with moderate amounts of horse serum, such as antitoxin, is confined to only a rare case. The sensitization of patients to different tissues or fluids of the same animal also varies. Taking for example the beef animals, the same patient may be sensitive to any one alone or to any combination of the following tissues or fluids; namely, meat, milk, serum and hair. The same holds true for the fowl, in regard to feathers, meat and egg, and for the sheep, in regard to wool, meat and serum. The same patient may be sensitive to any one alone or to any combination of the different structures of the plant; namely, to the seed, the pollen, and the leaves. Patients differ in their sensitization to the individual proteins of the same cereal; for instance, the same patient may be sensitive to any one alone or to any combination of the individual proteins of the wheat kernel. Even the amino-acids give a positive skin reaction. The above examples show the specificity of the skin test in separating more or less closely related proteins, and they do not really represent examples of multiple sensitization. I think multiple sensitization should be restricted to sensitization with proteins that are less closely related. For example, we find that the same patient may be sensitive to any combination of the proteins derived from plant, animal, food or bacterial sources; thus we have a combination of widely separated proteins. This type of multiple sensitization is very common and these cases are the most difficult to treat. Thus it is seen that it is necessary to test with an almost unlimited number of proteins before one can say that a patient is not sensitive to proteins. For practical purposes, however, such an outlay of proteins is not necessary, since, as already mentioned, the majority of sensitive patients with bronchial asthma are sensitive to the kinds of proteins that have been mentioned earlier in this paper; namely, horse dandruff, *Staphylococcus pyogenes-aureus*, wheat, the pollens, *Staphylococcus*

pyogenes-albus, cat hair and a few very common foods.

A few words will dismiss the nonsensitive patients. Of the 150 patients in this series, 45 per cent. failed to react to any protein that was tried. It is possible that the intradermal test would change some of these cases from the nonsensitive to the sensitive group, and if this is true, the bacterial proteins would most likely be the ones that would produce this change. This statement will be verified later on.

Besides the skin test, other facts would seem to warrant the division of bronchial asthmatics into two groups. No patient that had onset of asthma after the fortieth year of age has given a positive skin test, and one half of the sensitive patients began to have asthma previous to the age of twenty. Quite opposite to these statements is the fact that 40 per cent. of the nonsensitive patients had onset of asthma after the fortieth year of age and only 15 per cent. had onset of asthma previous to the age of 20. Only 1 per cent. of the sensitive patients had cardiorenal disease; whereas 20 per cent. of the nonsensitive patients had this complication. Chronic bronchitis was a complication in only a small number of the sensitive patients, but it was a complication or cause of asthma in nearly all of the nonsensitive patients. These statistics thus seem not only to separate bronchial asthma into two types, namely a sensitive and a nonsensitive, but they are of value in determining the cause and the treatment of bronchial asthma. For instance, the patient that has onset of bronchial asthma early in life is usually sensitive to some protein, chronic bronchitis is not a usual complication, and cardiorenal disease is a rare complication. Contrary to the above, the patient that has onset of asthma after the age of 40 is not sensitive to proteins, chronic bronchitis is almost always a complication or cause, and cardiorenal disease is frequently a complication or cause of asthma.

With the serum of our sensitive patients we have done complement fixation and precipitin reactions, using the protein to which they were sensitive as an antigen. These tests have proved to be of no help in the diagnosis, prognosis or treatment of the condition. A small number of the sensitive cases do give positive complement fixation and precipitin reactions, but the majority fail to do so, and the positive tests are rendered negative by a few injections of the antigen. Serum agglutination tests have been done with the common types of bacteria in both sensitive and nonsensitive cases. We have found that the serum of many patients that are sensitive to the protein of *Staphylococcus pyogenes-aureus* agglutinates strains of this organism. The serum of a few of the nonsensitive patients also agglutinates this type of organism, and treatment with vaccines of this organism in these nonsensitive cases is followed by relief from asthma. Therefore an agglutination between the serum of a nonsensitive patient and strains of *Staphylococcus pyogenes-aureus* is an indication for treatment with vaccines of this organism.

The treatment of the nonsensitive group of bronchial asthmatics has been disappointing. About one case in every six has been relieved of asthma by vaccines made from a diphtheroid organism. This particular type of organism was selected because it was usually the predominating one in the patient's sputum when the sputum was cultivated on plain agar. It seemed to make no difference whether the patient was given a stock vaccine of this organism or an autogenous vaccine. The vaccine was given once a week in gradually increasing amounts, over a period of two or three months. Relief from asthma continued for several months after the vaccines were discontinued. The serum of about one in every eight of the nonsensitive patients agglutinated strains of *Staphylococcus pyogenes-aureus,* and these patients have been satisfactorily treated with stock vaccines of this organism. Relief from asthma in these cases has continued for from four to six months after the vaccines were stopped. Those patients who do not come within either of these two groups have been treated without relief with vaccines made from the organisms that are commonly found in the respiratory tract. Likewise those patients who were relieved by diphtheroid and *Staphylococcus pyogenes-aureus* vaccines were also treated with vaccines made from the usual respiratory tract organisms without relief, thus showing a specificity among bacteria in the treatment of bronchial asthma. The nonsensitive patients usually have complicating diseases, such as chronic bronchitis, emphysema and cardiorenal disease, and it is quite possible that these conditions may be the cause of asthma in such patients. At any rate, these conditions must be treated, and it is in such patients that potassium iodid gives more or less relief. In these nonsenstive patients it is possible that the intradermal test would be helpful, and we would expect that bacteria would be found to be the cause of asthma.

The sensitive patients offer a very good prognosis. If the patient is sensitive to the food proteins, omission of these foods from the diet is followed by relief from bronchial asthma, unless the patient has considerable bronchitis, which may require attention, and we find that vaccines made from the predominating organism in the patient's sputum greatly benefits or relieves this condition. We have treated our wheat cases with subcutaneous injections of the wheat proteins, but we have been unable to increase the patient's tolerance for these, and the eczema that is a frequent complication in these cases has been made worse. Therefore omission of the food proteins from the diet seems to be the simplest treatment for this type of bronchial asthma. Treatment with the amino-acids of the food proteins may be of benefit.

Those patients who are sensitive to bacterial proteins are successfully treated with stock vaccines of that particular organism to which they are sensitive. These vaccines have been given at weekly intervals, in gradually increasing amounts, beginning with 200 million the first dose. Relief from attacks of asthma has continued for from four to six months after the vaccines were discontinued, and relapses have yielded to a second series of vaccines more quickly than to the first series. Large doses of vaccines at first or a sudden large increase in the dose is detrimental, and has precipitated attacks of asthma. It is interesting that the serum of asthmatics that agglutinates *Staphylococcus pyogenes-aureus* before treatment fails to agglutinate this organism after treatment; an increase in agglutinins would be expected.

Bronchial asthmatics that are sensitive to the proteins in horse dandruff and cat hair are relieved of attacks during a series of subcutaneous injections with these proteins. Treatment has not been discontinued in a sufficient number of these cases to definitely say how long relief may continue after treatment is omitted. But patients have remained free from

asthma for six and seven months during treatment, and a few patients that have not been treated for four months still continue to be free. Treatment is begun with the dilution of the protein next higher than that to which the patient reacts. Usually the patient gives a positive skin reaction with a dilution of 1:100,000 of these animal hair proteins, so that treatment is begun with a dilution of 1:100,000. The amounts of the dilution must be slowly and gradually increased with each treatment in order not to precipitate an attack of asthma. Horse asthmatics should not be given large amounts of horse serum intravenously without previously testing the patient with horse serum and horse dandruff; this naturally applies to antipneumococcus serum therapy. If the asthmatic is sensitive to horse dandruff proteins and not to horse serum, he may be injected slowly with as much as 60 c.c. or more of horse serum before signs of an asthmatic attack develop, and if the injection is stopped at this time no serious results follow and the asthma is controlled by epinephrin chlorid. If, however, the asthmatic is senstive to horse serum, a subcutaneous injection of 0.25 c.c. of antipneumococcus serum will produce violent asthma. Such a patient may be desensitized by frequently repeated gradually increasing doses of horse serum given first subcutaneously and later intravenously, so that the patient may be given 60 c.c. or more of antipneumococcus serum intravenously before symptoms of asthma appear. This method of desensitization with horse serum protects against horse serum for many weeks, but it protects against horse dandruff proteins for only a day or two, so that injections of horse serum are of little or no value in the treatment of horse asthma.

Treatment with all of the proteins that have been mentioned reduces the positiveness of the skin test and sufficient treatment renders the skin test negative to these proteins. Treatment with one protein desensitizes against all closely related proteins; for instance, treatment with one of the proteins found in animal hair or wheat desensitizes against the other proteins that are present in the same hair or in wheat. But treatment with a protein does not desensitize against other proteins that are not closely related; treatment with the horse dandruff proteins does not desensitize against cat hair protein, and treatment with the wheat proteins does not desensitize against the protein found in other cereals. Therefore, there is a specificity among proteins in the cause and in the treatment of bronchial asthma.

Patients who are sensitive only to closely related proteins such as already outlined are the simplest to treat and those who are sensitive to several types of proteins which are not closely related are the most difficult to treat. This is because at first one cannot judge which protein is the cause of asthma at the present time and so several proteins may have to be tried before the correct one is used.

Patients with bronchial asthma associate attacks with cold air, dampness, changeable weather, winds, menstruation, indigestion, nervousness, irritability, colds and bronchitis. After treatment with the proper protein these patients become tolerant to such conditions, so that they can be exposed to them without asthma resulting, and they become free from nervousness, irritability and indigestion without the use of drugs and hygienic measures. There seem to be two types of colds and of bronchitis, one of which is anaphylactic, and relief or freedom from this type follows proper treatment with proteins. The other type is caused by bacteria and frequently vaccines relieve and prevent this type.

We no longer feel that bronchial asthma is a surgical disease. Practically all of our patients have had nose and throat operations with little or no benefit. We do not advocate removal of tonsils, adenoids, spurs, deviated septums, hypertrophied turbinates, etc., for the relief of bronchial asthma. These conditions often need to be remedied for the general health of the patient, but rarely do such operations relieve bronchial asthma. Sensitization tests should first be tried and treatment should be given according to its dictates. If the patient's asthma happens to be caused by bacteria it is quite possible that foci of these bacteria may be present somewhere in the body, and such foci should be looked for in the teeth, tonsils, etc.; such foci should be removed.

In this paper I have outlined our work. For more detail those interested are referred to a series of papers already published or soon to be published in the *Journal of Medical Research*.

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ABSTRACT OF DISCUSSION

DR. W. T. LONGCOPE, New York: We have treated some cases of egg asthma. Only a small proportion showed hypersensitiveness to foreign proteins. We think it is possible to differentiate two groups, one which can be artificially sensitized, and the other to which the asthmatics and cases of urticaria belong. Persons who have had large doses of horse serum will react to horse serum if given after a period of twenty-one days; these patients do not have asthma, however. Therefore these artificially sensitized individuals are not sensitive to foreign proteins. It has been well known and it has recently been suggested that this hypersensitiveness is inherited, and there are instances in which the hypersensitiveness comes through the male members of the family.

DR. MARK J. GOTTLIEB, New York: We have found that occasionally a patient may be sensitive to the antigen, and yet, no reaction occurs on exposing the scarified portion of the skin to it. It seems possible and likely that the anaphylactic phenomena occur after applying the antigen in question to the mucous membrane or tissues other than the skin.

In a recent paper by Drs. Erscheimer and Kahn, they pointed out that possibly the poisonous substances floated in the blood stream during the attack of asthma. They treated their patients by injecting large quantities of autogenous defibrinated blood intramuscularly. It occurred to us, that possibly their contention was correct, and we forthwith started out to prove or disprove it. We procured the blood from a patient who was having a severe attack of bronchial asthma. This blood was defibrinated at the bedside. Six-tenths of this blood was injected intravenously into three guinea-pigs. Three others received an equal quantity of blood prepared in the same way from a nonasthmatic. Two of the guinea-pigs that were injected with the asthma blood showed definite anaphylaxis. One died about eighteen hours after the injection. His lungs showed an occlusion of the bronchioles, a marked distention of the alveoli and a round cell infiltration of the vessels. The same experiment was repeated, with comparatively negative results, with blood from another patient who was having severe asthmatic symptoms. The controls were negative.

DR. M. I. KNAPP, New York: My experience with asthma embraces about 300 cases; with few exceptions, all successfully treated. A woman who consulted me about indigestion and who also suffered from asthma, had insufficiency of the pylorus. After a few weeks' treatment she surprised me by telling me that she no more had asthma. I believed this to be a mere accident. This experience has repeated itself in three subsequent cases. Under certain conditions in insufficientia pylori, not in all, there is an increased intra-abdominal

pressure, due to the excessive production of gases. This, I reasoned, in pressing upward against the diaphragm and through it against the lungs, produces in the lungs the condition which we recognize as asthma. All asthmatics suffer from the overproduction of gas. Having come to this conclusion, I could understand why my patients were cured of their asthma; namely, the curing of the intestinal condition ended the gas pressure against the lungs, which were now able to expand normally. In my experience there is only one asthma—bronchial asthma—although heart or kidney disease may complicate it, which does not make it cardiac or renal.

DR. ERNEST ZUEBLIN, Cincinnati: I agree with the author that part of asthmatic symptoms are due to systemic infections, but also quite a number of cases are due to intestinal putrefaction, or at least that symptom is present in a great number of cases, as shown in an interesting paper by Allen Eustis. This author obtained encouraging results with a diet containing only a small amount of histidin, which substance and its split products can produce symptoms resembling asthma. My clinical studies in that disease have always revealed abnormal gastric secretion, besides disturbances in the utilization of proteins. Of further interest in such cases is the frequent presence of low blood pressure, and particularly of a low pulse pressure, which necessarily is unfavorable for the work of the heart, the latter offering, as found by threshhold percusion in a number of my cases, a dilatation of the right ventricle. There is not one single cause, but many causes for asthma; the task of the diagnostician must be just to find out the individual cause, which must be duly considered in the management of the treatment. It may seem peculiar that bacterial absorption, as well as intestinal absorption, may lead to asthmatic symptoms. From the chemical standpoint perhaps the split products from either source may act similarly on the cardiovascular and on the sympathetic nervous system as well.

DR. L. F. BISHOP, New York: There is no question that some young people are sensitive to unusual proteins, and I am convinced that a great many older asthmatics are also sensitive to food proteins. Aside from laboratory work by the method of variants, one can take any patient and test his food relations. The question of diet is one of quality and not of quantity. On this ground I have devised a system of diet which I call the "few proteins" diet. I found that it was only when one had eliminated as many proteins as possible from the diet that one obtained results.

I begin with castor oil, and then cut out meats and soups made with meat stock from the diet, also eggs and fish. I had a patient, an asthmatic for fourteen years, who, when put on a very strict diet, got much better. I took away the eggs and fish from his diet and he got so much better that he continued the diet of his own accord. I got a letter from a very prominent physician in Milwaukee a few days ago who told me he had become immensely improved since he had taken eggs out of his diet. Lately he had taken eggs by chance and had a very bad attack. Since then he has cut out eggs.

DR. G. N. JACK, Buffalo: During the last eighteen years, in conjunction with a general practice, I have made a study of 889 cases of asthma and their relation to food and weather conditions. Owing to the unstability of the blood of the asthmatic and summer-autumnal coryza subjects, their blood is rendered hypersusceptible and sensitized to numerous metabolic, gas, weather, and food conditions.

DR. S. SOLIS-COHEN, Philadelphia: The causation of asthma is not only protein but protean, and there are many factors which must be studied. It belongs to the group of visceral neuroses dependent on autonomic imbalance. In all of these, there is first an underlying or "constitutional" liability; second, an exciting factor; and third, a local determinant. In asthma this triple nexus is most evident. Usually—translating our ignorance into Greek—we speak of these peculiar reactions to various stimuli as "idiosyncrasies"; to call them "anaphylaxes" is equally unenlightening until we can determine why John should exhibit "wheat anaphylaxis" and Mary "horse anaphylaxis"—and we have not even approached that point. But I have shown that in all these food and drug "idiosyncrāsies," and in the pollen "idiosyncrasy" we call "hay-fever," there exists a fundamental ataxia or imbalance of the vegetative—or, to use Langley's inclusive term, "autonomic"—nerve system. Its cause and its endocrinal associations are "other stories" for which there is not now time. Asthma is one of this group of recurrent syndromes, depending on the incidence of an appropriate exciting factor, which may be a weather condition, an emotion, a chemical or mechanical irritant, food, pollen, microbe, or any one of a thousand things. Then comes the local determinant, which is often a diseased condition of the respiratory mucous membrane. This may have its seat in the tonsils, adenoids, bronchi, nose or anywhere in the respiratory tract. When we have found these three factors—all of them—then we can treat the patient scientifically as well as rationally. When we can't we must treat empirically—but not irrationally.

DR. I. CHANDLER WALKER, Boston: I agree with the first discussant in that proteins may be the cause of asthma in some patients who fail to give positive skin tests and who may not be sensitive to proteins. In regard to pyloric insufficiency, we have not observed such a condition, although we have made bismuth Roentgen-ray studies on many patients; we have frequently found malpositions of the abdominal viscera, such as low stomachs and low transverse colons, fixed colons and fixed cecums, etc., and we feel that such conditions by causing stasis may increase the liability of the absorption of partially digested foods, and these, in turn, may cause asthma. Also such conditions may lead to fermentation and distention of the intestines, and this, in turn, by pressure on the diaphragm, incites asthma. In regard to the autonomic imbalance, if you choose to consider this condition, we might very well consider that the proteins furnish the toxin or irritant that causes the imbalance.

ANESTHESIA IN CURRICULUM AND CLINIC*

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I hope that the critical conditions confronting our profession and medical schools may impart a timely interest in this subject. The teaching forces of the latter are to be reduced. The country needs, as never before, well trained physicians. New subjects, suddenly made important by the war, must be taught. The time demands a critical examination of our program of teaching to avoid waste of energy. We must plan to make each effort count, or the training of our graduates will suffer. Therefore, let us consider briefly the condition of the medical curriculum as a whole before assigning to the subject of anesthesia its position, relative importance, and method of presentation.

With the progress of medical knowledge new subjects are constantly being crowded into the course of study. Despite a gradual increase in the period of instruction up to the present duration of practically seven years, the crowding continues. This process has been carried to a limit at which it threatens to defeat important ends of medical instruction. I lately heard an officer of high rank in the government medical service declare that he does not expect recent graduates in medicine seeking admission to the public service to pass the examinations in anatomy and physiology. Experience, he said, has taught him that graduates from even the best of our schools have nearly always forgotten what they once knew of these subjects. Facing such facts it takes considerable

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temerity to advocate the introduction of a new subject into the curriculum, or a more extended presentation of subject already there.

Now, if the only possible method of securing any increase in the student's knowledge were to add more hours or more courses to the schedule, then nothing short of grim necessity could at present justify any addition. But such is not the case. In planning our curriculum we have, I fear, lost sight of the fact that the progress of medical science tends as often to simplify instruction therein as to complicate it. Instead of assuming that the increase of knowledge makes it progressively more difficult to turn out a competent physician, with the necessary corollary that a limit must be reached at which no competent practitioner can be produced, we are justified in assuming quite the reverse, or, more properly, that the difficulties will remain about stationary. The curriculum must be constantly modified. As fresh material is added, dead material must be cut away.

But the process of elimination is not the only available means of saving time and energy, thereby increasing the efficiency of our teaching. By a study of the best methods of presenting our subject matter and of making sure that our students master each topic as it is presented, we can do wonders in the same direction. We must consider the relative importance of different subjects, their proper correlation, in what order to present them, how to prevent needless duplication of study, how to direct the student's reading, and how to provide for adequate reviews. If, as teachers of medicine, we apply to our work these common sense efficiency methods, and above all have a clear conception of exactly what we wish to teach, the crowding of the curriculum will no longer trouble us.

The foregoing remarks on the present state of the medical curriculum have been introduced to disarm the prevalent prejudice against making any further demands on the medical student. If the arguments presented are valid, then we need not fear to introduce any instruction which a well trained physician should possess. If our graduates need more than we have been giving them about anesthesia, the fear of overcrowding the curriculum need not deter us from giving them the necessary information. What, then, are the claims of this subject to a place in the course of study?

That the faculties of our medical schools believe that some instruction in anesthesia is desirable is shown by their answers to a questionnaire sent to them by a committee of the American Society of Anesthetists. Through the courtesy of this committee I was permitted to read these answers. They showed that nearly every school gives more or less instruction in anesthesia. It seems to me, however, that they also show a general failure to grasp the basic importance of the subject in modern surgery. Anesthesia is not an isolated topic, to be jammed somewhere into the course, but a fundamental principle, like asepsis, which must be applied to almost every phase of surgical treatment. Let us amplify this statement.

The discovery of anesthesia made modern surgery possible. As surgeons attempted more and more complicated and prolonged operations there had to be a corresponding improvement in the methods of combating pain. Better methods of administering general anesthetics were introduced and local anesthesia with its modifications was discovered and brought into general use. But the development of the subject did not stop here. It was found necessary in order to increase the safety of operation to study the effects of general and local anesthesia on the various physiologic and psychologic processes of the patient. These investigations in recent years have had the most far-reaching and beneficial effects. Witness the studies of surgical shock, of postoperative lung complications, of chloroform necrosis of the liver, and of the effects of anesthetics on the resistance of the tissues to disease. They have brought about a general realization of the importance of a thorough scientific examination of the patient as a preliminary to operation, in order that he may be given the benefit of that form of anesthesia and of operative technic which will subject him to the least possible risk. Today this knowledge must be part of the equipment of every one who attempts to do surgery, or who has charge of patients who may require surgery. We must, therefore, regard instruction in anesthesia as incomplete if it covers merely the technic of administration, important as this may be. It must be broadened to include all the material which we have briefly outlined.

Objection may be taken to this broad conception of the importance of anesthesia, on the ground that it has been stretched to cover subjects which properly belong elsewhere. If so I have no quarrel with those who would limit what they term anesthesia to instruction in the actual administration of anesthetics. But, I insist that provision should be made somewhere for teaching the subjects I have discussed, and believe that they can be most effectively presented in connection with the subject of anesthesia.

In the first part of this paper I spoke of the simplification of instruction by proper correlation of subjects. It is my contention that no subject should be presented as a separate entity. As a teacher of surgery I have endeavored to apply this principle to the presentation of the subject we are considering. The plan I have adopted and which has worked very well is the following: In the second year a course termed surgical physiology is given. The purpose of this is to impress the students at the beginning of their course in surgery with the fundamental relations of physiology to surgical treatment. In this the physiology of the respiration and circulation as affected by surgical diseases or procedures is studied. Here we discuss surgical shock, hemorrhage, the effects of asphyxia, methods of artificial respiration, etc., and point out the relation of these matters to practical anesthesia. The students are encouraged to regard surgical operations as methods of correcting deranged physiologic processes. General anesthesia is taught with the conception that its fundamental object is to relieve pain and dangerous muscular movements while interfering as little as possible with the normal course of respiration and circulation. This not only makes it easy to impart the essential principles of anesthesia but also gives a valuable review of important parts of physiology. Most medical students have opportunities to administer anesthetics during their third and fourth years. This course enables them to do this with some degree of intelligence and profit. In the clinical work of the third and fourth year the same matters are frequently emphasized at the bedside and in the operating room. By this method we dispense with the necessity of a formal and distinct course in general anesthesia and present the subject in its proper relations to clinical medicine and operative surgery.

The foregoing instruction quite naturally includes such matters as the form of general anesthesia to be employed in different cases and the conditions under which general anesthesia should be replaced or supplemented by local or regional anesthesia. Where the latter methods are employed details as to strength of solutions, manner of injecting and the regional anatomy of the parts operated on are emphasized. The information on regional anatomy required for the intelligent use of local anesthetics is adequately covered by arrangement with the department of anatomy. This correlation furnishes a beautiful illustration of the principle that it is easier to remember two things than one. What medical student ever enjoyed the dissection of the sensory nerves, or ever retained longer than during his examination any definite knowledge of their distribution? If, however, he is told that by injecting drugs at certain places a given area will be made insensitive to pain, how much more interesting will the subject become, and hence how much more likely will he be to retain a knowledge of it. A review of the subject at the operating table will serve to fix it definitely in the student's mind.

The collection of the data on which we form a judgment as to the condition of the patient's circulatory and respiratory apparatus and his general state of health is obviously a matter to be taught by the department of medicine. If before operating on any patient we always insist on the production of adequate information of this kind and point out its bearings on the operative risks involved we make all necessary provision for the training of the student in this phase of anesthesia. Likewise instruction in regard to the purity and effect on tissues of various anesthetic drugs is best introduced by the department of pharmacology, and reviewed and emphasized in the clinical courses.

As to the conditions under which students shall be trained in the actual administration of anesthetics we shall speak in the remainder of this paper, which has to do with anesthesia in the clinic. This is a much mooted topic. That our anesthesia is no better than it sometimes is, is not due to any lack of easily available scientific knowledge, but to a failure of proper organization. We all know what should be done to safeguard our patients before, during and after the administration of an anesthetic. It is a matter of arranging that under all conditions every necessary safeguard shall be provided. We must see to it that every patient has been properly examined and properly prepared for operation and that the anesthetic is skilfully administered according to the requirements of the operation. In a busy hospital, teaching or otherwise, there is only one way to secure these results. This is by placing an experienced anesthetist with a broad knowledge of general medicine and surgery in charge of the work. The problem consists in securing such a man. It can be done by paying him sufficiently well and by making his position one of sufficient interest and importance to satisfy his professional ambition. To men of this kind and so situated we must look for the advancement of anesthesia.

The anesthetist should be consulted by the operator in regard to the general character of the anesthesia required by each case. He should be familiar with the results of the examination of all patients preliminary to operation. He should instruct the interns and medical students in everything which has to do with the actual administration of the anesthetic. In a teaching hospital, I believe it a mistake to require him to attend personally to any but the more difficult administrations. Otherwise the interns and medical students will be deprived of a highly important part of their training, and the anesthetist will have no time to carry on scientific investigations in his specialty. With this plan of organization there will be no difficulty in securing good anesthesia together with excellent instruction in anesthesia for every medical student.

This subject has taken on a new importance since we entered the war. Many, possibly all, of our graduates will have to administer anesthetics, whether they wish it or not. That the necessary theoretical instruction in anesthesia can be presented without deranging or upsetting the curriculum I have attempted to show in this paper. I close with the recommendation that to insure a minimum of practice to every student in the actual administration of anesthetics, our medical schools adopt the requirement that every student be obliged to give, under suitable supervision, a definite number of anesthesias.

ABSTRACT OF DISCUSSION

DR. ARTHUR DEAN BEVAN, Chicago: I think Dr. Gatch's conclusions, in the main, are correct and that they will be helpful to the medical schools of this country in reorganizing their medical curriculums to include a course on anesthesia. There can be no doubt that anesthesia is such an important part of our work that it should be made a compulsory, not an elective, course in the medical curriculum. We have, in our own school, maintained that position for some time and have required a certain number of lectures and demonstrations in anesthesia, the course being given once in the fall and once in the spring term; and then each student is required to give a certain number of anesthetics under instruction. Certainly that should be carried out in every school. The subject, of course, touches a great many departments, as Dr. Gatch has pointed out, and comes up in physiology and pharmacology, and should be attacked from a number of different angles. At the same time I think the instruction in anesthesia proper should be a subtopic of the surgical course, and it should be so associated with the surgical work that it is not entirely separate, but that it be given a certain amount of independence. In this department there should be some head of the subdepartment, if I may call it so, who is thoroughly competent to do three things: first, to give the students proper instruction; second, to do research work in that line. It is not sufficient simply to have a trained nurse give an anesthetic and give it well. Let me draw a parallel of that situation: I have an attendant in my pathologic laboratory who can mount and cut and prepare microscopic and gross sections as well or better than any other man in my department, I have no doubt; but where would that laboratory be as far as scientific research work is concerned if we relied entirely on that attendant? That is where the surgical department stands when the anesthetic end is entirely in the hands of a trained nurse. No matter how well trained she may be, she is not prepared to give the proper instruction, nor is she prepared to add to the sum of existing knowledge in that subject by properly carried on research. Nor is she prepared to develop the third principal function that the head of that department on anesthesia should be able to do, and that is to give advanced instruction—to prepare experts in anesthesia—to give to a certain limited number of individuals that sort of expert knowledge that will make them experts in that particular subject. I am in sympathy with Dr. Gatch's position, and I want to emphasize that I think we should today place anesthesia in exactly the same position that we do many other of our subtopics in surgery or in medicine; that we demand of the department more than that it be simply a mechanical thing well done and possibly safely done; that we demand not only instruc-

tion of our students and the development of experts in that particular line, but that we demand of that department such strength and such organization as will enable it to carry on research work and to add to our present sum of knowledge.

DR. EDWARD WALLACE LEE, New York: I believe absolutely and thoroughly in all that has been said in regard to training, and all that pertains to the scientific administration of an anesthetic; but one point I want to bring out is that the administration of an anesthetic by an intern should be held up to him as an ambition and a privilege, and if he attains that privilege he must work for it. I speak of that because the general feeling today among interns is that they do not like it when they are appointed, as they often express it, to "give the dope." The giving of the "dope" in a great many hospitals has sort of degraded, in the minds of the intern, that very responsible position, and I make the suggestion that an intern, before he has the privilege of administering an anesthetic, should be made to understand, or he should be inspired with the idea that there must be some ambition, something he must work for before he is permitted to give an anesthetic. Make a thing hard to get for a student, give him to understand that he has reached an exalted position, and he will be more keen and more ambitious and will take a greater and a keener interest.

DR. A. F. ERDMANN, Brooklyn: Perhaps it is fair that one of the men who has taught the subject we are discussing today should say a word. For a number of years I have been endeavoring to do what Dr. Gatch has been talking about—to teach students anesthesia. I have found that all we can teach them to do is to be administrants rather than to be anesthetists. I believe thoroughly in what Dr. Gatch has said, and I would explain myself in this way. In the earlier days we probably gave more time to the teaching of anesthesia, but not in the right way, for not enough attention was given to its proper relation to allied subjects. It does seem to me that time could be very well used by the instructor if he could take up the work in the different departments, as Dr. Gatch suggested; that is, that he should teach anesthesia in connection with surgery; that he should teach it in connection with physiology and with pharmacology. There must be some definite correlation and agreement; otherwise a surgeon's teaching might be at variance with that in the physiologic department; and so a physiologist might differ with a pharmacologist. I have known that to happen. One man would teach one thing and another man another. If a man were big enough to be a surgeon, a pharmacologist, a physiologist and an anesthetist, he would be the ideal man. The work could be best done by a man who is able to do that sort of thing, because he would bring the instruction together, rather than have it done by half a dozen different men in half a dozen different ways.

DR. TORALD SOLLMANN, Cleveland: There is one phase of the matter that I would like to emphasize as a teacher of pharmacology, namely, that the teachers in charge of the clinical applications of the subject should inform themselves more than they appear in the habit of doing, as to how the subject is taught and to what extent it is taught, in the so-called fundamental branches. Anesthesia scientifically is a problem that does not differ from the other problems that concern biology, physiology or pharmacology. In its fundamental aspects it is perfectly capable of investigation by laboratory methods, perhaps even better than by clinical methods, and it is now covered in the fundamental courses to an extent that I believe would be rather surprising to the clinical men. I believe that the curriculum would be in much better shape if the men who are in charge of the clinical teaching of anesthesia would inform themselves of what is done in their own institutions in the fundamental branches of this subject.

I must differ to some extent with the last speaker in his idea that the subject of anesthesia should be taught in the fundamental departments by a clinical man who covers the entire subject of anesthesia. Such a conception of education is of course possible. We could have in the course of pharmacology one man come in to teach the subject of anesthesia from the pharmacologic standpoint, and another man to discuss the pharmacology of morphin from the standpoint of internal medicine, and another man to give the pharmacology of digitalis from the standpoint of the clinician. If we extended that system sufficiently there would be very little left for the pharmacologist proper to do; but on the whole it would give the student a rather choppy sort of view of the subject. I think it is better on the whole for the teachers in fundamental subjects to give a rounded-out course.

DR. KENNETH A. J. MACKENZIE, Portland, Ore.: We sometimes find ourselves confronted with difficulties in relation to the question of anesthetics and the message given by Dr. Gatch is a most timely one. In relation to teaching, the suggestion made by Dr. Gatch meets every indication. What could be better than the correlation of teaching so that the anatomist can give instruction in the proper manner, and at the proper time the physiologist, the biochemist and the pharmacologist. In the small clinic of which I have had charge for a number of years, we have pursued the following method for several years: In their senior year, after having previously been coached, four students enter the amphitheater, two at the head taking instructions from a trained anesthetist, and two assisting the operator under the tutelage of his assistant. One of the two students at the head takes his instruction in the immediate administration of the anesthetic; the other is studying the reaction of the operative procedures on the patient as registered by the sphygmomanometer. These records are not only taken, but recorded. When this method is followed it is astonishing what messages are received at times by the operator which would otherwise pass unnoticed. It was regarded at first as a bold step to put students within the operating field, but after their work has progressed for a month or two they begin to give the anesthetics themselves and to make useful observations, so that in a class of only twenty-five or thirty members all the students receive a considerable degree of instruction in operative technic and anesthetics, which we find increasingly useful as time goes on. Our wounds have not been affected adversely by this step, nor have casualties in anesthetics appeared more frequently. The experience has been most valuable for students.

DR. F. W. PINNEO, Newark, N. J.: I speak from the standpoint of the general hospital, not connected with a college, and would show the difficulty that not only colleges, but the whole medical world realize the need for better anesthesia. The basis of these problems is in the education of the intern. This education is of two kinds—theoretical knowledge when in college, which is inadequate, and anesthesia in practical surgery. Anesthesia has four factors, involving the induction of so-called comfortable anesthesia; second, even maintenance at only the desired depth; third, quick recovery; fourth, no after-effect. Now how can an intern solve these problems and what is concerned in them of the underlying medical sciences if he has not studied them theoretically and found in their application their correlation in anesthesia? He is much more than an administrant of the anesthetic. He has carried through the anesthesia after the choice of the anesthetic has been decided, and he is now in a safe and sufficient maintenance. In the maintenance of the anesthesia an administrator without fundamental knowledge may do very well, but when the interns get bad results they do not know what the trouble is. In a case in point intratracheal anesthesia was to be given; the hospital intern was administering it, and when I asked what he would do under certain problems of lack of oxygen and respiratory arrest, he said, "I don't know." To be sure his supervising anesthetist was at hand, supervising his work, but it shows—although he was a very good administrant—how little he was master of the possible problems he would meet and would have to solve instantly. I stand, therefore, for the education of the intern in order that the world can have better anesthesia, and this is a good time to talk of it when we consider how many men must go to the front and anywhere in the world give satisfactory anesthesia.

DR. WILLIS D. GATCH, Indianapolis: I agree with almost everything that has been said in this discussion. We in the teaching school ought to keep our methods as simple as

possible. With that end in view, at present when our students are going out into a service where they will have to meet trying conditions, I believe it might be helpful if we were to adopt a standard anesthetic and a standard method of administration, and train our students in it. I do not say what I think would be the ideal method for military surgical anesthesia. We should adopt a method of anesthesia which we know will work under all conditions; which will be as simple and as easy as possible.

SHOCK DURING GENERAL ANESTHESIA *

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Owing to the indiscriminate use of the term "shock," it seems necessary to define the meaning of the word as applied to this particular discussion.[1] It is used in the sense that the surgeon applies it when a patient develops alarming symptoms during or immediately following an operation, the definite cause of which is doubtful. While the data and conclusions presented are, to a considerable extent, experimental in origin, they may also be applied to corresponding clinical conditions. The two points of paramount importance in considering the subject of shock during general anesthesia are the cause or the causes of the condition and the effect of the anesthetic in either preventing or accentuating it. Owing to the general use of ether and the ease with which definite tensions may be administered it was the only anesthetic used in my experiments, and all the conclusions are based on this anesthetic.

In the history[2] of the subject there has always been a tendency to ascribe the condition of shock to a single cause, although the condition itself and the circumstances under which it developed have been quite varied. This tendency in all probability has reached its zenith, and it is quite probable that in the future both experimental observers and clinicians will study the subject with the view to determine the cause in each individual case. It is my purpose to discuss here the different possible causes of shock during anesthesia, the probable physiologic mechanism involved, and their relation to ether anesthesia.

In general, surgeons agree that the most common cause of the symptoms of shock, either as a primary or a secondary factor, is free hemorrhage. Experimentally this has also been found to be true. Many investigators have carefully determined and reported on the mechanism involved. It is important to emphasize the points that all persons do not react the same to identical losses of blood, and that estimates of the amount of blood lost during operative procedures must be inaccurate. Further insight into this form of shock awaits our more complete knowledge of the control of the volume of blood. It should be noted that the reaction following hemorrhage is very similar, particularly in regard to the vasomotor mechanism, to that following trauma to the abdominal viscera.[3]

The only uniform and certain method of producing shock experimentally is by exposure of the abdominal viscera. The time necessary to expose the viscera before shock develops is variable, depending on many conditions. Usually a state of deep shock takes place within an hour or two. Owing to the fact that in most experimental work shock has been produced by exposure of the abdominal viscera and that clinically most cases of postoperative shock develop after abdominal operations, more is known concerning this form of shock than any other. While the mechanism which produced the condition is not fully understood, many of the most important factors are known.

Undoubtedly the cause of shock produced by exposure and trauma of the abdominal viscera is mainly due to a failure of the venopressor mechanism as enunciated by Henderson,[4] although in all probability loss of carbon dioxid is not the primary factor. The investigations of Janeway and Ewing,[5] my own experiments and the work of others[6] make it possible to follow quite clearly the process by means of which the condition of shock is produced when the viscera are exposed. The process is as follows:

When the great delicate vascular area of the viscera is first exposed to the air, changes of temperature and handling, there is an immediate dilatation of all the arterioles in the exposed area. Rarely a short period of constriction precedes the dilatation. As a result of this dilatation of the splanchnic arterioles blood pressure decreases. The splanchnic capillaries and veins are markedly distended, which may be due to one or all of the following causes: a local inhibition of vasomotor tone, an active dilatation, changes in abdominal pressure, and venous obstruction. On the whole, the process resembles the first stage of acute inflammation and does not appear to differ essentially from the phenomena as observed in the classical experiments on the subject. After this initial fall in blood pressure the condition of the animal may remain stationary or even slightly improve. However, as the loss of tone and paralysis of all the tissue involved take place, the blood pressure progressively falls, the temperature becomes subnormal and the animal develops profound shock. This loss of circulatory fluid and changes in temperature quickly imperil the life of the cells of the rest of the organism and death usually results from anemia of the medullary centers, particularly the respiratory. At the time the viscera are exposed and during the period that shock is developing, the vasomotor center increases in tone and the untraumatized arteries constrict. The amount of this constriction depends on their previous condition and the degree of splanchnic dilatation. During this time the center will usually respond to reflex stimulation and asphyxia, which demonstrates that it is still active although not functionating to its maximum extent. When the state of shock is fully developed it is usually, but not always,

* From the Mayo Clinic.

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1. Mann, F. C.: The Peripheral Origin of Surgical Shock, Johns Hopkins Hospital Bull., 1914, **25**, 205-212.

2. Meltzer, S. J.: The Nature of Shock, Arch. Int. Med., July, 1908, pp. 571-588. Seelig, M. G.: The Nature of Shock, Internat. Abst. Surg., 1914, **18**, 117-123. Vale, F. P.: Concerning Shock, Med. Rec., New York, **66**, 325-330.

3. Mann, F. C.: Shock and Hemorrhage: An Experimental Study, Surg., Gynec. and Obst., 1915, **21**, 430-441.

4. Henderson, Yandell: Acapnia and Shock, I, Carbon Doixid as a Factor in the Regulation of the Heart-Rate, Am. Jour. Physiol., 1908, **21**, 126-156; Acapnia and Shock, II, A Principle Underlying the Normal Variations in the Volume of the Blood Stream and the Deviation from this Principle in Shock, ibid, 1909, **23**, 345-373; Acapnia and Shock, III, Shock After Laparotomy: Its Prevention, Production, and Relief, ibid, **24**, 66-85; Acapnia and Shock, V, Failure of Respiration After Intense Pain, ibid, **25**, 385-402; Acapnia and Shock, VI, Acapnia as a Factor in the Dangers of Anesthesia, ibid, 1910, **26**, 260-286.

5. Janeway, H. H., and Ewing, E. M.: The Nature of Shock, Ann. Surg., 1914, **59**, 158-175.

6. Morison, R. A., and Hooker, D. R.: The Vascular Tone and the Distribution of the Blood in Surgical Shock, Am. Jour. Physiol., 1915, **37**, 86-93. Muns, W. E.: Changes in the Peripheral Circulation Following Intestinal Trauma, Proc. Soc. Exper. Biol. and Med., 1914-1915, **12**, 87-90. Seelig, M. G., and Lyon, E. P.: The Condition of the Peripheral Blood Vessels in Shock, THE JOURNAL A. M. A., Jan. 2, 1909, pp. 45-48.

possible to obtain a response of the center, due to the long-continued blood pressure or to the fact that all untraumatized arteries are constricted to their maximum extent or that the great splanchnic area through which most reflex responses of blood pressure are produced is completely paralyzed.

The heart and respiratory mechanism are probably affected mainly by the loss of circulating fluid. The following facts should be emphasized: that the resulting condition is essentially one of loss of circulating fluid; that the process takes place in the area traumatized and in that sense it is peripheral; that the primary involvement of the nervous system is probably mainly in regard to the local reflexes; and that the higher nervous mechanism is affected secondarily.

I have never been able to produce in an etherized animal the shock produced by excessive nervous irritation which is the most popular clinical cause of the condition. A careful review of experimental work leads me to believe that other investigators have experienced the same difficulty. While all traumatic procedures, such as crushing joints, evulsing nerves, etc., will produce marked respiratory and blood pressure changes, it must be very rare for the condition of shock to develop. This must be due either to the fact that nerve impulses are not the primary factors in the cause of shock, or that ether protects the nervous mechanism from excessive stimulation.

The phenomena of so-called psychic shock, the shock of railway and other painful accidents, all testify that at least in some instances the nervous mechanism may be a factor in some forms of shock. An explanation of the cause of the condition in these cases is most difficult.

I have studied recently the effect of different traumatic procedures on decerebrated animals. Exposure of the abdominal viscera produces the condition of shock in exactly a similar manner in a decerebrated animal as in an etherized animal. No difference in the development of the process could be noted. Traumatic procedures on the limbs and nerves of a decerebrated animal, while producing marked individual variations, produce greater changes in respiration and blood pressure than in etherized animals and in a very small percentage of instances death is actually produced. This condition probably corresponds to the shock produced by accidents; I am not sure it has any relation to the shock produced under an anesthetic.

In the few instances in which death occurred, I was unable to determine the cause. However, I believe the factors involved will be found to be either excessive inhibition as held by Meltzer,[2] a decrease in general tone due to changes in the synapses as suggested by Hill,[7] or excessive depressor stimulations. If the latter is true, work along the line pursued by Ranson[8] should give positive results.

It is highly improbable that physiologic fatigue will be found to play any primary part in the production of shock, or at the most in only a small percentage of instances. The belief that physiologic fatigue is not a common cause of shock during anesthesia is based on several facts. The work of Porter[9] which demonstrated that the vasomotor center is not primarily fatigued by excessive stimulation and that electrical stimulation of the major nerve trunks for many hours did not produce shock, and my own experiments,[10] which show that it must be rare indeed for shock to be produced in an etherized animal by excessive trauma to nerves and limbs, prove that from the experimental standpoint, fatigue is not of great importance.

In a recent series of experiments I have investigated, quantitatively, the relation of nerve impulse to shock. Utilizing the method devised by Forbes and Miller[11] to detect the changes in potential at the brain stem of decerebrated animals following nerve stimulation, I have attempted to determine quantitatively the amount of nerve reaction produced by various operative procedures.

The method, which did not differ from that described by Forbes and Miller except that the electrodes were made large enough to connect both sides of the brain stem, consisted of connecting the brain stem of a decerebrated cat to a galvanometer and recording the changes in potential produced by different traumatic and operative procedures. These changes in potential depend on nerve reaction and have been shown to be a true index of the nerve impulse.[12]

Many difficulties were encountered in the investigation, the most important of which was to obviate the mechanical factor. Very slight movements of the brain stem will produce deflections of the galvanometer. This error was never fully obviated. However, by carefully immobilizing the animal and making careful controls it was possible to determine some of the effects of traumatic procedures. Of course only comparative studies could be made.

The results of this investigation are difficult to interpret, and until more experiments are performed conclusions must be cautiously made. However, the following facts seem true: (1) traumatic and operative procedures on the limbs, joints and nerves produce a very marked nerve response as shown by the deflection of the galvanometer; (2) exposure of the abdominal viscera produces either no deflection or a very slight one; and (3) pulling on the mesentery and other viscera produces a definite deflection but not so great as that usually produced by trauma to a leg. In fact, it was possible to expose the viscera and cause shock in an animal without producing any deflection of the galvanometer.

If future experiments, in which all errors are eliminated, prove these results to be absolutely true, it will be justifiable to conclude that the nerve impulse bears no qualitative relation to shock. The idea that shock due to visceral trauma is not dependent on a primary impairment of the higher nerve mechanism will be substantiated.

In the experience of some surgeons a small number of cases have occurred in which the amputation of a limb, an operation for an unuited fracture, or similar operations have resulted in conditions of shock. The experimental investigator has never been able to explain the cause of shock in these cases because he has not been able to reproduce them. The recent work

7. Hill: Further Advances in Physiology, London, 1909, p. 178.

8. Ranson, S. W., and Billingsley, P. R.: The Conduction of Painful Afferent Impulses in the Spinal Nerves, Am. Jour. Physiol., 1916, **40**, 571-584. Ransom, S. W., and von Hess, C. L.: The Conduction Within the Spinal Cord of the Afferent Impulses Producing Pain and the Vasomotor Reflexes, Am. Jour. Physiol., 1915, **38**, 128-152.

9. Porter, W. T.: The Effect of Uniform Afferent Impulses on the Blood Pressure at Different Levels, Am. Jour. Physiol., 1907-1908, **20**, 399-406. Porter, W. T., Marks, H. K., and Swift, J. B.: The Relation of Afferent Impulses to Fatigue of the Vasomotor Center, ibid, 444-450.

10. Mann, F. C.: Footnotes 1 and 3.

11. Forbes, A., and Miller, R. H.: Detection with the String Galvanometer of Afferent Impulses in the Brain Stem and Their Abolition with Ether Anesthesia, Am. Jour. Physiol., 1916, **40**, 148-149.

12. Forbes, A.; McIntosh, R., and Sefton, W.: The Effect of Ether Anesthesia on the Electrical Activity of Nerve, Am. Jour. Physiol., 1916, **40**, 503-513.

of Bissell,[13] and of Porter[14] will probably clear up these obscure cases. Bissell has shown that in patients suffering from fractures of the long bones there is a great increase in the fat content of the blood. Some of the patients dying with symptoms of surgical shock following operation which involved considerable trauma to large areas of fat showed a large amount of fat in the lungs, death being due undoubtedly to pulmonary fat embolism. Porter, while studying shell shock, was led to consider the possibility that fat embolism was the cause of the low blood pressure found in cases in which fractures had occurred. Undoubtedly in a small percentage of cases in which hitherto a diagnosis of surgical shock has been made it will be found that the patients are suffering from pulmonary fat embolism.

The endocrine glands have been given as factors in the etiology of shock. This idea has been largely associated with the suprarenals and is based on the facts obtained as follows: Elliott[15] showed that stimulation of an afferent nerve produced a discharge of epinephrin; Cannon and De La Paz[16] demonstrated that there was a discharge of epinephrin during emotional states; Corbett[17] investigated the epinephrin content in shocked animals and found it greatly diminished. Bedford and Jackson[18] found that in conditions of low blood pressure there was an increased amount of epinephrin in the blood. Bedford[19] showed that it was an active secretion of the suprarenals. Stewart and Rogoff[20] concluded from their work on the effect of nerve and drug stimulation on the suprarenal that the discharge of epinephrin from the suprarenal is not indispensable to life or health. My own experiments[21] have demonstrated that an animal may live for several days after the removal of all suprarenal tissue and maintain an apparently normal condition in all respects, including emotional reactions, and that an animal will survive and be maintained normally with only one half to one third of one suprarenal which has been separated from all nerve supply.

In all probability some of the endocrine glands, particularly the suprarenals, enter as factors in the complex condition of shock, but it is quite difficult to determine to what degree they participate as primary active agents in producing the state or how much they are affected by the low blood pressure and the changes incident to the condition itself.

There is no doubt that an anesthetic may prove harmful to a patient, but it is not possible to state to what degree ether is a factor in the production of shock. Henderson[4] has pointed out the dangers of light anesthesia. Certainly an animal can be killed in the very early stages of etherization by a too high concentration administered during excessive respiration, but this is more of an anesthetic than a shock problem. The effect of trauma and nerve stimulation during very light etherization probably causes harmful results mainly because of the ensuing struggling which they produce, as was shown by Gatch, Gann and Mann,[22] than for any other cause.

There seems to be little definite data as regards the question of whether hemorrhage under an anesthetic affects the individual more than without the anesthetic. My own experiments are too few at present to allow conclusions to be drawn. Also it has not been determined to what extent the loss of blood changes the reaction to definite tension of ether. Boothby[23] cites a case in which it was necessary to maintain the anesthetic tension the same as it was before (47) after a severe hemorrhage.

The result of excessively deep etherization is more nearly related to shock. Animals may be anesthetized for nine to ten hours with an ether tension just sufficient to maintain anesthesia for operative work without the production of a condition resembling shock. On the other hand, a higher tension which will depress blood pressure to or below the critical level and if maintained for one hour will produce most of the symptoms of shock. In such instances the blood pressure usually remains low and is not restored after an hour or two of artificial respiration. The animal depressed by ether, however, differs from the animal in shock in the fact that the former will become conscious and require more anesthetic even with a low blood pressure, while the latter usually will not. This depressed condition following deep etherization, while it is primarily due to the ether, is soon complicated by the condition itself, namely, low blood pressure, subnormal temperature, etc. The shock-like condition resulting is quite largely due to these secondary factors.

While ether depresses the vasomotor center directly it should be noted that the vascular system is affected by deep etherization in many other ways. Gatch[24] has pointed out that deep etherization also affects blood pressure by loss of muscular tone and a decrease in the action of the respiratory pump.

While studying the vascular and respiratory reflexes under various tensions of ether, I observed one phenomenon which may have a direct bearing on the cause of some cases which were diagnosed as shock. Stimulation of the vagus nerve and most of the other mixed nerves by a suitable electrical stimulus will produce inhibition of respiration. Simple stretching of some nerves, particularly the brachial plexus, will sometimes stop respiratory movements. It is interesting to note that ether never blocks these inhibitory reflexes, but as long as the respiratory center acts the reflexes are present. As the respiratory mechanism is depressed by the higher tensions of ether the inhibition following nerve stimulation usually becomes more pronounced. Finally, it is possible to use a tension under which respiration, though greatly depressed, would afford enough ventilation to keep the animal alive but which would be inhibited for so long following nerve stimulation that the animal would in all probability die if artificial respira-

13. Bissell, W. W.: Pulmonary Fat Embolism—a Frequent Cause of Postoperative Surgical Shock, Surg., Gynec. and Obst., 1917, **24**.
14. Porter, W. T.: Shock at the Front, Boston Med. and Surg. Jour., 1916, **175**, 854.
15. Elliott, T. R.: The Action of Adrenalin, Jour. Physiol., 1905, **32**, 401-467.
16. Cannon, W. B., and De La Paz, D.: Emotional Stimulation of Adrenal Secretion, Am. Jour. Physiol., 1911, **28**, 64-70.
17. Corbett, J. F.: The Suprarenal Gland in Shock, THE JOURNAL A. M. A., July 31, 1915, pp. 380-383.
18. Bedford, E. A., and Jackson, H. C.: The Epinephric Content of the Blood in Conditions of Low Blood Pressure and "Shock," Proc. Soc. Exper. Biol. and Med., 1916, **13**, 85-87.
19. Bedford, E. A.: The Epinephric Content of the Blood in Conditions of Low Blood Pressure and Shock, Am. Jour. Physiol., 1917, **43**, 235-257.
20. Stewart, G. N., and Rogoff, J. M.: Liberation of Epinephrin, Jour. Pharmacol. and Exper. Therap., 1916, **8**, 205; Liberation of Epinephrin from Adrenals, ibid, 479; Epinephrin Content of Adrenals, Jour. Exper. Med., 1916, **24**, 709.
21. Unpublished data.
22. Gatch, W. D.; Gann, D., and Mann, F. C.: The Danger and Prevention of Severe Cardiac Strain During Anesthesia, THE JOURNAL A. M. A., April 26, pp. 1273-1278.
23. Boothby, W. M.: The Determination of the Anesthetic Tension of Ether Vapor in Man, with Some Theoretical Deductions Therefrom, as to the Mode of Action of the Common Volatile Anesthetics, Jour. Pharmacol. and Exper. Therap., 1913-1914, **5**, 379-392.
24. Gatch, W. D.: The Effect of Laparotomy on the Circulation, Tr. Am. Gynec. Soc., 1914, **39**, 180-192.

tion were not maintained. This combination of deep anesthesia with inhibition of respiration may have been a factor in some cases which were called shock.

Bernstein[25] seems to have been the first to investigate the place in the reflex arc on which the general anesthetics (chloroform) acted. By destroying the blood supply to a portion of the spinal cord of an animal so that certain segments would not be affected by the anesthesia, he showed that stimulation of a sensory nerve whose cell body was in an anesthetized part would not produce a motor response, but that the stimulation of a sensory nerve whose cell body was not anesthetized would produce a motor response. This proved that chloroform acted first on the sensory side of the reflex arc. Deeper anesthetization depressed the motor side as well.

In a previous investigation of the condition of shock I concluded that ether prevented afferent impulses from reaching the higher nerve centers. Recently Forbes and Miller,[11] by means of the galvanometric method previously described, have clearly demonstrated this fact in a very delicate and graphic manner. By connecting a galvanometer to the brain stem of a decerebrated cat they were able to show that a weak stimulation of the sciatic nerve produced a deflection of the galvanometer corresponding to a difference of the potential following nerve response; after etherization this deflection did not occur but reappeared when the animal recovered from the anesthetic. Undoubtedly ether does block afferent nerve impulses to the higher centers.

SUMMARY

Surgical shock, using the term in the sense employed by the surgeon, occurring during general anesthesia may be due to several causes. For a correct understanding of the physiologic mechanism involved it is necessary to differentiate between these possible causes.

The most common cause of the symptoms of shock is free hemorrhage. It should be emphasized that all persons do not react the same to loss of blood and that the estimation of hemorrhage during operation is very inaccurate.

Another common cause of shock is trauma to the viscera. Under this condition shock is due to loss of circulatory fluid in the traumatized areas, mainly brought about by a local peripheral mechanism.

Shock produced by excessive nerve irritation under an anesthetic is probably a much more rare occurrence than clinical reports would seem to show. The mechanism involved in these cases is unknown. In cases of fractures and operations involving trauma to large areas of fat in which shock is diagnosed, pulmonary fat embolism may be a cause.

Some of the endocrine glands, particularly the suprarenals, are factors in some causes of shock; but it is very difficult to determine to what degree they participate as primary active agents in producing the state, or how much they are affected by the low blood pressure and the changes incident to the condition itself.

The nerve impulse probably bears no quantitative relation to shock.

Deep etherization may produce most of the symptoms of shock. The continued depressed state following deep anesthesia, while primarily due to the anesthetic, is soon complicated by the resulting factors of low blood pressure, subnormal temperature, and other changes.

Some cases of the conditions diagnosed as surgical shock may be due to a combination deep anesthesia with reflex inhibition of respiration.

Ether certainly does block afferent impulses to the higher centers but some of the reflexes involving the medullary centers, particularly those which inhibit respiration, are not blocked when very strong stimuli are employed.

25. Bernstein, J.: Ueber die physiologische Wirkung des Chloroform's in Moleschott, J.: Untersuch. z. Naturl. d. Mensch. u. d. Thiere, Giessen, 1870, **10.**

ABSTRACT OF DISCUSSION

Dr. Fenton B. Turck, New York: I have carried out investigations on shock in animals under anesthesia with the abdomen open and with the abdomen closed. The two conditions differ. I wish to call attention to one of the important findings in my investigations. A Brücke lens, used by the older physiologists, I found valuable in examining the vascular supply of the viscera in shock. The first change found taking place in the exposed viscera was venous dilatation as the first sign of shock, followed by changes in blood pressure and temperature. The various stages of these changes, beginning as Dr. Mann reports, with slight rosy tint, then going into the bluer shades, finally develop into complete shock with large tortuous vessels. I reported, in 1896, shock as a local peripheral disturbance first involving the veins of the viscera. Dr. Crile came to Chicago at the time I was continuing my experiments in shock and brought out his vasomotor center exhaustion theory in his vivid fashion, afterward presented as the Cartwright lectures. Kocher and others have practically disposed of the question of this vasomotor center exhaustion theory. My more recent investigations have been carried out on histologic lines, with sections fixed in vivo, and confirm my earlier findings. If we expose the viscera to the air and find shock intervening, a certain selected area is held and fixed in fixing solution and section is made to observe the exact changes taking place in the advancing stages of shock. We obtained sections from one to six hours, of the different portions of the viscera of various animals in shock, and all presented similar phenomena. First there is an alteration in the venous walls, especially "waxy" changes of the muscle cells, with relaxation and turgescence of the veins. The contents of the veins then pass out through the walls, and asphyxiation of the muscle cells of the walls and tissues occurs, which gives the picture of so-called "acidosis." Also, the experiments that I have published in anesthesia, chloroform, ether and other anesthetics being used, set forth how we found that there was an excretion into the intestines of the anesthetic used. After prolonged anesthesia we plugged up the esophagus so none of the anesthetic could reach the stomach direct, and scraped off the mucous membrane and recovered the anesthetic from the mucosa. The changes were very manifest in the abdominal viscera as a local condition similar to the conditions in shock. The experiments showed that there was a loss of antiferments in the blood. The "acidosis" was often benefited by alkalies. The greatest injury was exposure of the viscera to air. I demonstrated the value of a rubber dam for the purpose of protecting from the air the whole of the viscera during operative procedures, and the introduction into the abdominal cavity of heat. Small rubber bags filled with hot water were placed in the abdominal cavity, and small bags attached to a stomach tube were introduced into the stomach, most marvelous results being produced. The heat stimulation was not remarkable for its restoration of the local circulation alone, but of the whole of the viscera. I do not know of anything so striking as the effects compared with the animal used as a control. Both animals were in shock, but one had bags filled with hot water placed in the abdominal cavity, and had the viscera covered with a rubber dam to prevent evaporation and the dissipation of heat, and hot water bags in the stomach, thus keeping up the continuous stimulation of the venous circulation with the reduction of shock.

Shock appears to be a local manifestation observed in the splanchnic area, and is more promptly obtained by exposure of the viscera to air. The result of anesthesia, in which there is excretion of the anesthetic into the alimentary tract, may also be similar to manifestations of shock. The arteries contract always and the veins dilate, and that seems to be the law that governs shock. The unstriated muscle cells in shock show early protoplasmic changes.

DR. SAMUEL J. MELTZER, New York: I agree with Dr. Mann that the term shock, as it is now used, covers a variety of forms which superficially look alike. I am reminded of the good old time when many practitioners made a diagnosis of "a touch of malaria." We ought to learn how to diagnose internal hemorrhage or a fat embolus, etc., and not call them shock. Shock may occur without these phenomena and even without a fall in blood pressure.

I said years ago that shock is an inhibitory phenomenon. I am afraid that those who do not agree with me do not understand my point of view. I do not deal with the *cause* of shock but only with its *nature*. I said that in shock some, or many, or all nerve cells, and perhaps also other functionating cells of the body, are partly or wholly inhibited, their activities are suppressed. This state can be brought about by a variety of causes, of which trauma is one. A clear example is the temporary depressing effect of cutting of the cord on the nerve cells in the section below the cut. For hours no reflex can be elicited from this section. Concussion of the brain is probably a fact in spite of the disbelief in it of our modern surgeons. They may change their minds about that as they changed about antisepsis. The terrific shell explosions on the battle field are well fitted to cause concussion and shock.

When shock affects many cells of the body, cell activities will be greatly reduced; hence, perhaps, the reduction of carbon dioxid in the body fluids. Acapnia, therefore, is perhaps the *result* of shock and not the *cause* of it.

DR. FRANK C. MANN, Rochester Minn.: In regard to the discussion of hemorrhage in connection with the shock problem, I do not mention hemorrhage as a cause of shock but as a cause of the symptoms of shock. In a paper with any clinical application I think it is important to emphasize that, because in clinical reports of patients who have been said to have died of shock, usually it is found that a certain amount of hemorrhage has also occurred. It is known from experiments as well as from clinical observation that different persons do not react the same to hemorrhage, and in a certain proportion of cases diagnosed as shock, hemorrhage was undoubtedly the cause of the condition, and the diagnosis from a purely technical conception of shock was incorrect.

In regard to Dr. Meltzer's inhibition theory, I am not sure that the results we get on exploration of the abdominal viscera in which there is a stasis in the blood vessels is not due to an inhibitory mechanism, but I am sure that if this is the case it involves the lower neurons and not the higher nerve centers. I feel confident of this because in a series of experiments in which the cervical cord was sectioned, dilatation and stasis in the blood vessels of the viscera took place on exposure in the same manner as when the higher centers were intact. When we devise some method of demonstrating psychic shock experimentally, inhibition will probably be found to be a factor.

Street Accidents Increase.—There have been in New York during the last six months 12,284 street accidents, as against 10,593 for the corresponding period in 1916. There was a 20 per cent. increase in accidents last June as compared with June, 1916. The report of the commissioner of highways just published shows that 63 per cent. of the accidents are recorded between noon and 8 o'clock in the evening, as compared with 24 per cent. between 4 and 8 a. m. This increase in the number of accidents has prompted Police Commissioner Woods to make an appeal to merchants, manufacturers and truckmen requesting them to have the bulk of their heavy hauling done between 4 and 8 a. m., causing a better distribution of traffic.

THE BLOOD LIPOIDS IN DIABETES *

E. P. JOSLIN, M.D., W. R. BLOOR, PH.D., AND HORACE GRAY, M.D.
BOSTON

With an excess of fat diabetes begins and from an excess of fat diabetics die. In 45 per cent. of our diabetic cases an increase of body fat preceded the onset of the disease, and in 60 per cent. of the fatal cases abnormalities of fat metabolism resulting in acidosis caused death. Such facts show the need for an intensive investigation of fat metabolism in diabetes. The importance of the problem is further manifest when it is realized that there are approximately 1,000,000 individuals in the United States who either have or will have diabetes before they die. As a preliminary to the investigation of fat metabolism a knowledge of the fat in the blood is essential. Save for Bloor's series of thirty-eight accurately analyzed diabetic bloods no extensive data of this sort exist.

For this reason, and to serve as a basis for further work, during the last eight months a study of the blood lipoids of the diabetic patients at the New England Deaconess Hospital has been carried out by Horace Gray, working in the laboratory of Biological Chemistry at the Harvard Medical School with W. R. Bloor. Complete analyses of 131 specimens of blood, taken from eighty-seven patients, were made for the three groups of lipoids of the blood; namely, the fatty acids, cholesterol and lecithin. Not only were these three groups of lipoids determined in the whole blood, but in each instance in the plasma and corpuscles as well. In this paper salient points brought out in the analyses relating to the whole blood alone will be mentioned, leaving for Dr. Gray to report at another time his work in extenso.

These data, taken in conjunction with thirty-eight analyses, made by W. R. Bloor on the Deaconess patients last year, render it possible to draw deductions of therapeutic value. To the clinical student of diabetes these analyses are of much interest, for they represent progress along one of the two lines of investigation in diabetes that today promise the most to investigator and patient alike. These are the developments of our knowledge about the metabolism of fat and the explanation of the power of a diabetic patient during fasting to show a respiratory quotient above that of a normal individual under the same circumstances.

It is desirable to refer to the fat in the blood as blood lipoids, because the so-called blood fat is present in several forms. Of these lipoids about 50 per cent. exist as combined fatty acids, mainly oleic and palmitic; 30 per cent. more or less is in the form of cholesterol (and cholesterol esters), while the remaining 20 per cent. is composed of lecithin and related bodies which are distinguished by their content of phosphorus. The lipoids represented by the cholesterol and lecithin groups constitute most of the "built in" fat of the body. If a term is desired to cover these two substances, the already existing description cytolipoids is suitable. A fat man is good natured; his fat tissue like his disposition is free from acid qualities.

* From the Laboratory of Biological Chemistry of the Harvard Medical School and the Laboratory of the New England Deaconess Hospital.
* Read before the Section on Practice of Medicine at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

It is readily comprehensible with so many different substances making up the lipoids in the blood that progress in the study of the same has been slow. Even today the nomenclature alone is a serious handicap, but a still greater obstacle has been the complexity of the analytic methods employed for the determination of these various lipoids. It is only recently that it has been shown that analyses of the lipoids to be accurate must be begun within one hour from the time the blood is drawn. No ready test has been available by which a knowledge of the total lipoids could be obtained, and to determine each lipoid separately is impracticable in clinical work. The cloudiness of the plasma, the old clinical test, is not a guide, for there are clear plasmas which when tested are hyperlipemic and cloudy plasmas which on analysis show a normal quantity of lipoids. Hitherto evidence based on a sufficiently large series of diabetic cases has been lacking to show whether the estimation of the quantity of one lipoid would furnish information of enough clinical value to warrant the neglect of the remaining lipoids.

The 131 analyses made by Dr. Gray are most helpful in this connection, for they teach that when made by Bloor. The table shows the number of bloods analyzed; the percentage of lipoids obtained by Bloor's method in the whole blood and plasma; the total fatty acids in whole blood, plasma and corpuscles, respectively; and the same for lecithin and cholesterol, the glycerids in the plasma and corpuscles, and the total lipoids in the plasma. Figures are inserted for comparison with the results of former analysis. Incidently the percentage of blood sugar is given.

The specimens of bloods obtained have been separated into three groups based on the clinical condition of the patients on the day the samples of blood were drawn. In general the mild diabetics showed a positive carbohydrate tolerance of 50 or more grams; the moderate cases of diabetes a tolerance between 50 and 10 gm., and the severe diabetics a tolerance below 10 gm., and often a minus carbohydrate balance. The presence or absence of acidosis and the blood sugar values were also considered in the grouping of the patients. Occasionally the blood of a patient was considered as belonging to the severe group of diabetes, whereas a later specimen belonged distinctly to that of another group. It was perfectly clear that this method

BLOOD LIPOIDS IN DIABETES

	Number of Bloods	Fat by Bloor's Method		Total Fatty Acids			Lecithin			Cholesterol			Glycerids		Total Lipoids	Blood Sugar, per Cent.
		Whole Blood, per Cent.	Plasma, per Cent.	Whole Blood, per Cent.	Plasma, per Cent.	Corpuscles, per Cent.	Whole Blood, per Cent.	Plasma, per Cent.	Corpuscles, per Cent.	Whole Blood, per Cent.	Plasma, per Cent.	Corpuscles, per Cent.	Plasma, per Cent.	Corpuscles, per Cent.	Plasma, per Cent.	
Normals	23	0.59	0.62	0.37	0.39	0.34	0.30	0.21	0.42	0.22	0.23	0.20	0.10	0	0.68	0.10*
Mild diabetes	32	0.83	0.90	0.59	0.64	0.45	0.32	0.24	0.42	0.24	0.26	0.21	0.38	0.18	0.98	0.17
Moderate diabetes	37	0.91	1.06	0.65	0.75	0.48	0.33	0.28	0.40	0.26	0.30	0.20	0.46	0.23	1.16	0.26
Severe diabetes	55	1.41	1.80	1.01	1.28	0.62	0.40	0.40	0.40	0.41	0.51	0.24	0.84	0.38	1.98	0.23
Mild diabetes																
With nephritis	12	0.87	0.93	0.63	0.66	0.53	0.32	0.24	0.43	0.24	0.26	0.22	0.41	0.24	1.01	
Without nephritis	20	0.86	0.88	0.54	0.63	0.40	0.32	0.24	0.41	0.25	0.25	0.21	0.36	0.13	0.97	
Severe diabetes																
With acidosis	21	1.32	1.66	0.99	1.23	0.58	0.39	0.38	0.40	0.33	0.43	0.22	0.82	0.32	1.81	
Without acidosis	34	1.49	1.87	1.02	1.31	0.64	0.41	0.41	0.40	0.46	0.57	0.25	0.86	0.43	2.07	

* Estimated, not analyzed.

Bloor's so-called fat method is used, 91 per cent. of the total lipoids in the blood are obtained, the variations from this average not being over 5 per cent. above or 3 per cent. below the 91 per cent. mentioned. We therefore recommend this method to clinicians in the routine study and treatment of their patients.

The Bloor method[1] is sufficiently simple for clinical use.[2] A single analysis can be performed in an hour and a half, but a series of twelve analyses could be completed in a day. An analysis for cholesterol requires half again as long, and for lecithin twice the time. The Bloor method is advantageous therefore (1) because by it at least 90 per cent. of all the blood lipoids are determined and (2) because it furnishes information of a representative character concerning all the blood lipoids, since by means of it all the fatty acids existing as glycerids are thus obtained, as well as those in the cholesterol esters and in lecithin.

In the accompanying table are embodied the data on which the conclusions which follow it are based. For comparison, in the first line is inserted the average figures for the analyses of twenty-three normal bloods of differentiation was fairer than to separate the bloods on the basis of patients alone.

All types of diabetes are distinguished by a marked increase in lipoids of the blood, and the general statement can be made that the increase is progressive with the seriousness of the disease. Thus, the average quantity of lipoids obtained by Bloor's method in the whole blood amounted to 0.59 per cent. in nineteen normal individuals, but was increased to 0.83 per cent. in thirty-two mild diabetics, to 0.91 per cent. in thirty-seven moderately severe diabetics, and to 1.41 per cent. in fifty-five severe cases of diabetes. The increase holds not alone for the lipoids obtained by this method, which, as before said, amount to approximately 91 per cent. of the total blood lipoids, but for each of the three groups of lipoids. Although the quantity of total fatty acids is trebled, the cholesterol is only doubled and the lecithin increased but one third. The increase in cholesterol is significant and suggestive, and seems indeed pathognomonic of the prolonged diabetic hyperlipemia, since Bloor has found it lacking in the acute lipemia of overfeeding which is characterized by an increase in the total fatty acids alone. In Dr. Gray's detailed paper, which will contain many facts not touched on here, he will show

1. Bloor: Jour. Biol. Chem., 1914, **17**, 379.
2. The latest modifications are given by Joslin: The Treatment of Diabetes Mellitus, Ed. 2, Philadelphia, Lea and Febiger, 1917.

that the variation in the lipoids takes place chiefly in the plasma; in fact, with lecithin and cholesterol there is practically no change in the corpuscles between normal individuals and the different types of diabetes.

So large a number of the cases of mild diabetes were accompanied by renal involvement that this group is divided into two classes, and the average analyses of twelve mild diabetic cases showing nephritis are compared with twenty mild diabetics that were free from nephritis. The table shows a remarkable uniformity of results in the two groups, and this uniformity is so close that it holds not only for the lipoids determined by Bloor's method, for the lipoids in the plasma, but also for the constituent lipoids, the fatty acids, lecithin and cholesterol.

From analysis of the individual specimens of blood of normals and diabetics it is also possible to arrive at a lipoid threshold, analogous to the blood sugar threshold. To be sure, this is not absolutely definite, but it is sufficiently distinct, for the number of mild diabetics with low lipoids which reach the high level of normal individuals is negligible. With Bloor's fat method this normal lipoid threshold can be stated to be not far from 0.67 per cent. As a matter of fact only 9 per cent. of 131 diabetic specimens of blood showed a level below this.

The fifty-five analyses made on severe diabetics were also divided into two groups, according to the presence or absence of acidosis. With the recent work of Fitz on beta-oxybutyric acid and its allies in the blood, it is, however, questionable whether one is justified without blood analyses in considering a case of diabetes to be actually free from acidosis. But in the main it is true that in the one group acidosis was distinctly present and to a marked degree, and in the other, the ordinary signs of acidosis, such as the ferric chlorid test for diacetic acid, the Fridericia test of the alveolar air, and the Van Slyke test of the blood, were absent. The compilation of the data gave unexpected results, and at first sight would indicate that the patients with severe diabetes that were free from acidosis showed a higher lipoid content than their companion diabetics that presented all the typical signs of acid poisoning. But if the entire series of 131 bloods is examined to determine the relation between acidosis and the lipoids, the evidence is clear that the cases of diabetes with acidosis exhibit a higher level of total lipoids than the cases without acidosis. It is an interesting fact, however, and one worth further study, that when the bloods obtained during acidosis are classified according as to whether the acidosis is mild, moderate or severe, the lipoids are found to be nearly twice as great in those bloods obtained from patients showing moderate acidosis as from those patients who showed severe acidosis. We hesitate to even speculate on the explanation of these figures, until a more detailed study of the individual protocols has been made.

In general, it may be said that the lipoids in the blood decrease with fasting, but more evidence is needed on this point, for it is quite possible that the extent of adipose tissue in the body is an important factor. Whereas a diet rich in fat favors an increase of lipoids in the blood, it is certainly true that fat is not the only element in the diet which must be considered in this regard, for a study of food charts of the patients indicates that the presence of carbohydrates in the diet is an important element.

The maximal value for lipoids in this series of 131 bloods occurred in Case 786, which showed total lipoids of 16.3 per cent. On another occasion, this same patient showed approximately 9 per cent. of lipoids, but following restriction of diet, the lipoids decreased to nearly 1 per cent.

An analysis of the lipoids before and after ether anesthesia in one case deserves attention. It showed that the total fatty acids were increased after the operation, whereas the lecithin and cholesterol remained unchanged. The increase in total fatty acids was followed later by a fall in the same below that of the patient's level before anesthesia.

The blood lipoids do not rise and fall with the changes in the blood sugar. Thus, the moderately severe cases of diabetes showed higher blood sugars than did the severe diabetics. The blood sugar was not nearly as accurate a test of the severity of the case of diabetes, measured from all points of view, as was the lipoids of the blood. It would appear that a knowledge of the blood lipoids would be distinctly more helpful from the prognostic point of view than a knowledge of the blood sugar. Cases of diabetes with high lipoids present a less favorable outlook than cases with low lipoids.

ABSTRACT OF DISCUSSION

DR. R. GEYELIN, New York: During the past year at the Presbyterian Hospital I have been more or less interested in the macroscopic appearance of the plasma for fat. As Dr. Joslin has pointed out, this is not an accurate guide to the amount of lipemia, as some patients showing turbidity of the plasma, according to quantitative chemical methods, have no increase in the fat content of the blood over normal. It was first brought to my attention by noticing in severe cases of diabetes that there was a marked increase in the turbidity of the plasma, and when I say a marked increase I mean an appearance which looks very much like thickened cream. There was one case which, in view of what Dr. Joslin has told you, may be of some special interest relative to the value of the blood fats from the standpoint of the patient's subsequent tolerance. I do not want to draw any conclusions from one case, but a brief outline will perhaps be of interest. This patient had a lipemia so marked that it looked like thick cream; at the same time the blood carbon dioxid was slightly depressed; according to the combining method it was about 25, and the blood sugar was over 500. The patient showed symptoms of a mild acidosis and it took six days of fasting to clear them up. The blood carbon dioxid combining capacity came up to 45 and stayed up, and the blood sugar came down 500 to 250 in two months' treatment, with a great many fast days thrown in. That patient never developed a tolerance of over 500 calories in spite of the fact that foods were shifted around in various ways to determine whether there was any class of food to which she was particularly susceptible. All the time the appearance of the plasma was that of thick cream, whereas the blood sugar and blood combining capacity stayed where it was. It was not until after two months of treatment that the blood plasma lipoids became almost clear, the blood sugar and blood combining capacity staying about where they were before. The patient's tolerance was increased almost twofold inside of two weeks after the plasma became clear. Now, are we going to find that the fat content of the blood, that is, the lipoids, have any relation to the patient's tolerance? That is, is it going to be found when we diminish by treatment the lipoids that the patient's condition is going to improve? This particular case has been in marked contrast to that of two other patients whose blood lipoids, at least from the gross appearance, decreased, and whose blood cleared up at the same time that the blood carbon dioxid combining capacity went up and the blood sugar came down.

Dr. F. M. Allen, New York: I do not believe anything can be said offhand on a subject as little understood as the blood lipoids. A subject is always opened up when the necessary methods become available, and it is to be hoped that the methods of Bloor will serve to bring light on these problems. These extensive observations of Drs. Joslin and Gray are important pioneer work on the clinical side. A fundamental question back of these phenomena is why fat behaves in this way in diabetes. Evidently it is one more illustration of the fact that diabetes is an impaired assimilation of all foods, and not merely of carbohydrate. But the mechanism by which fat is normally taken up from the blood, and which breaks down in diabetes, is unknown. We have some animal experiments in progress which may later yield a little information concerning it. One point which may perhaps be shown when Dr. Joslin's full figures are published is the possible influence of lipemia on the carbon dioxid capacity of the blood. When the plasma is so full of fat, what is the relation between its carbon dioxid capacity and the values in the alveolar air? Therapeutically, it is always desirable, and generally possible, to clear up a pathologic lipemia. We have had some patients in whom heavy lipemia was thus cleared up and who are alive now. High lipemia was formerly regarded as a very bad prognostic sign, and presumably an intractable lipemia may still be so considered. Dr. Geyelin has had some of the severest cases of diabetes ever described. The one which he reported with Dr. Du Bois was perhaps the severest ever studied by accurate methods. There is a possible question whether the metabolism is in some cases specially defective on the fat side and in other cases on the carbohydrate side. Distinctions in types of diabetes have generally proved unreal. Probably the apparent differences in lipemia and other symptoms will be explainable by diet and other special influences.

Dr. Horace Gray, Boston: Dr. Geyelin's point, as I understand it, is that two of his patients, as they improved, lost their cloudy plasma, while another patient, who improved little, kept the cloudiness. That can perhaps be reconciled with our figures by saying that although, in general, it is distinctly not safe to judge the amount of fatty substances in the blood by the appearance of the plasma, still the very creamy plasmas do have high lipoids. Stating this in other words, we have described plasmas in twelve divisions, from "clear" to "thick creamy." In the lower divisions up through "very cloudy" it is a delusion to think one can predict whether the lipoids will be high or low, but the plasmas which were described as "milky," "creamy," and "thick creamy" did regularly have a high lipoid content.

Dr. Allen's point about bad prognosis in patients with creamy plasmas agrees with Dr. Joslin's patient, Case 786, who had thick creamy plasma and total lipoids of about 16 per cent. It may interest you to know incidentally that the highest value generally accepted in the German literature is about 19 per cent., while there have been reported even higher.

When you start to do this work two things need to be agreed on: the method and the nomenclature. The naming is a complicated business, but one thing we can easily do is to use "lipemia" in a more definite way. To some people it means a cloudy plasma; to others it means a large lipoid percentage on analysis. We might well adopt the French "lactescence" for the gross appearance, and restrict "lipemia" or "hyperlipemia" to the chemical analysis, similar to the use of the term "hyperglycemia." The method which Dr. Joslin has recommended under the name of "Bloor's fat method" was called by Dr. Bloor "total-fat." Dr. Joslin and I venture to urge this change of name to avoid confusion with "total lipoids," which, being a more inclusive term, seems more entitled to be called "total."

For a routine practice the use of whole blood instead of plasma is easier and requires less blood.

Social Reform.—All attempts at reform at present should be in the direction of acquiring greater flexibility in the social organism, not in the direction of a definite system.—*Scientific American.*

STANDARDIZATION OF SERUMS AND VACCINES

SOME DIFFICULTIES AND MISUNDERSTANDINGS

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The misunderstanding that exists even among usually well informed health officers and physicians in regard to the standardization of biologic products is sufficient reason for a brief consideration of the subject. For example, under the heading "Standardization of Biological Products" on page 1416 of The Journal, May 12, 1917, a note states that the official Conference of State and Territorial Health Officers adopted a resolution recommending that the Public Health Service "establish and promulgate standards as to potency with reference to all biologic products, vaccines and serums, not only with relation to diphtheria and tetanus antitoxin, but especially with relation to antimeningococcus and pneumonia serums, and vaccines for typhoid fever, paratyphoid fever, and bacillary dysentery."

A standard is defined as "that which is set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality; especially the original specimen weight or measure sanctioned by government as the standard pound, gallon, yard, width, or the like."

One sees that there are strict limitations as to what may be allowable under the definition of a standard. Those who have devoted the most time and have had imposed on them the greatest responsibilities in relation to the field of biologic products have thus far been willing to recognize as standardizable only a small number of preparations. Firmly based on substantial scientific grounds, standards have been formulated for the antitoxins of diphtheria and tetanus. In the case of the former we have as a standard a serum which laboratory tests and long observation have shown to be constant, a true standard by which specimens of antidiphtheria serum can be measured, though perhaps not quite so accurately as we can measure things which do not depend on living creatures (guinea-pigs) for the indications that the end of the measure has been reached. With slight modifications, what has been said of diphtheria antitoxin may be said of tetanus antitoxin. It is not the purpose to go into the details of the beautifully worked out methods of testing these antitoxins, but the standards have now been in use for a number of years, and are very satisfactory; though unless large numbers of test animals are used, only approximate measurements of the strength (unitage) of given specimens of serum may be made. A most important point is the fact that the measure of the antitoxic value of these serums is also a measure of the usefulness of the product in clinical use.

At the Hygienic Laboratory, much time has been devoted also to the standardization of antityphoid vaccine, and there has been devised a tentative standard for this agent. This tentative standard requires that the dose intended for human beings, when administered to rabbits in a certain manner, shall provoke a certain agglutinin response. It was recognized that the agglutinin response was not necessarily a measure of the prophylactic value of the vaccine as applied to man, but it was felt that the procedure would improve the quality of the vaccine on the market, which had

been found to be very variable. Experience has shown that it is advisable to furnish a standard vaccine and to require that commercial products shall equal that in agglutinin producing properties; in this manner, inequalities in results, due to differences in technic, are eliminated.

This completes the list of preparations for which there are standards, only a small fraction of the great number of biologic products on the market. This does not mean that attempts at standardizing other products have not been made. It simply means that science has not progressed far enough to enable the proper authorities to set up a rule for the measurement of preparations which are of recognized value.

There are three fundamental difficulties in standardizing biologic products. The first of these is the fact that none of the factors is constant. We are dealing with living organisms in which vital processes are going on, or with the products of these vital processes, and we know that neither processes nor products are constant. It is true that certain of the toxins and antitoxins are relatively stable, when kept under certain conditions, and this stability was at once utilized to establish such standards as we now have.

The second great difficulty is the fact that animals must be used in making comparisons between the standard and the preparation to be investigated. Individual laboratory animals vary in their reactions to toxic agents to which they are susceptible, as well as to the antitoxic agents, these terms being used in a broad sense.

The main difficulty, however, is the fact that we lack laboratory animals susceptible to many of the agents which we need to test; thus, the ordinary staphylococcus, the gonococcus, and the pertussis bacillus are good examples of organisms which we cannot submit to animal tests.

These points make it clear that, in the very nature of things, we cannot hope to have standards which are comparable to those of a purely physical nature, or even to those having a chemical basis.

When a preparation is in the purely experimental stage, that is, before clear evidence as to its value is available, it would be a waste of time and energy to try to standardize it officially; and the same may be said of products for the value of which there is no substantial basis.

Certain preparations which have passed the experimental stage within recent years, and certain others the value of which has long been established, are without recognized standards, as will be shown presently.

Aside from the purely technical difficulty of standardizing many preparations is the fact that the establishment of an official standard is likely to be regarded as setting the stamp of governmental approval on claims made for the usefulness of the preparations. It would certainly be contrary to public interest if official action capable of such interpretation should be taken. The German authorities have established a number of provisional standards for biologic preparations, but the wisdom of the policy is debatable.

SPECIAL PREPARATIONS

Some of the special preparations that have been mentioned as being in need of standardization, a need that no one will deny, will be considered.

Antimeningococcus Serum.—The effectiveness of this agent seems to be established, but experience has shown that at least some specimens of serum have been found to be useless in certain outbreaks of meningitis. One reason for this, of course, is that, from an immunologic point of view, there is a very considerable variation in the organisms isolated from various sources. The meningococci have been divided into groups depending on their serologic reactions, but there is no agreement among workers as to the number of groups nor the characteristics which govern the differentiation of the several groups. All antimeningococcic serums are polyvalent, that is, contain antibodies for various cultures of the organism; but just what constitutes sufficient polyvalency is not determined. It would not be sufficient to say that a serum shall represent a minimum number of different cultures, because this might overlook whole groups; nor would it suffice to say that all groups of the organism must be represented, although this is inquired into during governmental inspections, because of the lack of agreement as to grouping and the fact that immunologic relations of individual members of groups vary considerably. These difficulties have not deterred those who are interested in the subject from endeavoring to establish some criterion of the value of the serum.

All serums made in the United States are submitted to some form or other of potency test. Several manufacturers determine the agglutination titer of the serum, others, the titer in a complement deviation complex, while others make an opsonic index determination. An animal protection test is also in use. Unfortunately, there is no agreement among those who have given this subject special attention as to which test is the more satisfactory; no proposed standard has sufficiently impressed those who are concerned with this problem to lead to its adoption.

Good authorities insist that the results of the therapeutic use of the serum afford the only reliable evidence of its value, and it may be remarked that almost any manufacturer can produce glowing testimonials as to the clinical results of the use of his product. The question that naturally occurs is why some one of these tests is not adopted, and all serums required to comply with it. The answer is that in spite of much experimental work we are without sufficient evidence as to the superiority of any method of testing. The multiplicity of types of meningococci, and the variations even among members of the same group of organisms, make accurate standardization impossible at the present time.

The serums made by American manufacturers represent all the way from ten to forty-six strains of meningococci, and most manufacturers make it a rule to utilize every new strain that comes into their possession unless it is one that is immunologically identical with cultures they are using already.

Finally, an additional obstacle to the standardization of the product is the fact that, even when all conditions are favorable, it is difficult for two workers, using the same method, to get comparable results.

Antipneumococcus Serum.—It is only recently that the value of serum in this disease has been put on a sufficiently substantial foundation to justify its general use. Indeed, this serum illustrates the creation of a demand prior to the placing of the product on a sound scientific basis. As soon as it became known that there was in experimental use a promising treatment for pneumonia, physicians naturally desired to utilize it in a disease otherwise most unsatisfactory from a therapeutic point of view; and manufacturers sought

to meet the demand. In the case of pneumonia we have conditions somewhat analogous to those in meningococcus infections, though probably less complex. The causative organisms of pneumonia can be divided immunologically into several groups; four, according to Cole and his collaborators.

At the present time there is evidence of the therapeutic value of a serum prepared against but one of the types (Group I). While scientific observation has failed to show the value of specific serum against the other groups (II, III, IV), or of Group I serum against these other groups, clinicians working without group determinations and presumably without adequately controlling their work, have reported satisfactory results from the use of the serum in pneumonia in general. We may be pardoned if we remain skeptical as to the validity of the observations.

Antipneumococcus serum affords a good example of the difficulties in standardization when what we might call the "test object" is a living organism. It is impossible to secure a constant minimum lethal dose of culture as a criterion. The rate of growth varies, and the virulence varies. With these factors so inconstant, and yet absolutely vital, there seems to be no immediate prospect beyond the establishment of a provisional standard.

Other Serums.—When we come to consider these, we find that there is practically no ground for establishing standards. To say that they should show some evidence of potency, without prescribing a minimum, is futile; to prescribe a minimum that would not be reasonably near the maximum obtainable would put a premium on mediocre work on the part of producers; and we have no means of demonstrating the maximum degree of potency.

Bacterial Vaccines.—It is perhaps not too sweeping to say that at present, as regards the majority of bacterial vaccines, potency standardization is both impracticable and undesirable. Aside from antityphoid vaccine, evidence of value is meager, and practically none of the vaccines can be submitted to potency tests on laboratory animals. Generally speaking, the doses that have been adopted are purely arbitrary. In many cases the dose might be multiplied by ten, or divided by the same factor, without, so far as we know, influencing the effect of the vaccine.

The determination of the number of organisms per given volume of fluid is apparently a simple procedure; but, as a matter of fact, two workers equally careful will often get most divergent results; even when the same method is employed, and when different methods are used, the results are little better than guesses based on turbidity would be. Obviously this is a minor matter, in view of what has been said above regarding the size of dose.

The question of standardization of tuberculins is one that recurs constantly. These agents are employed comparatively little in the treatment of tuberculous infections, but they are used rather extensively in diagnosis. The varieties are legion. It would scarcely serve merely to require that they shall produce a reaction, unless we prescribe the quantity and the dilution. Nor do we know whether or not the results of animal experiments are comparable with the results that may be expected when the agent is applied to man.

Vaccine Virus.—The ultimate criterion of the potency of this agent is the percentage of "takes" it will give, when used to vaccinate persons not previously successfully vaccinated. Whether any testing on laboratory animals can be used as a satisfactory substitute for this is uncertain.

Even here there must be qualifications, if we are to speak in terms of a standard; thus, how large an abrasion is required to give a successful result, and how much may the vaccine be diluted and still give uniform success? This particular product does not especially concern those of us who are familiar with the subject of standardization, because the demand for vaccine virus comes largely from health officials who are in position to judge from the results of use as to the potency of a given manufacturer's product. If the vaccinator gets poor results he is not likely to order a second supply from the same source. In other words, a poor product will not be a commercial success. It is the judgment of those who have had most experience with the subject that we should not at present insist on a vaccine which is free from contaminating micro-organisms, though the promising work of Noguchi leads us to hope that we may have a dependable pure vaccine in the not far distant future.

Antirabic Virus.—So long as the preparation of this agent followed, or followed approximately, the original Pasteur method, the products probably varied comparatively little. Now, however, there are available dialyzed and desiccated viruses for which certain advantages are claimed; attempts at standardizing these have been made, but there is not sufficient evidence to warrant the adoption of a standard.

In connection with vaccine virus and antirabic virus, there is this element of security in regard to potency: The propagation of the product requires the inoculation of material from animal to animal; and the failure in one case to develop pocks, and in the other the failure to produce rabies, would indicate at once that the material has become inert; in either case, failure to infect animals used for propagation may be regarded as evidence of the lack of power to protect man.

Many products may be tested by purely serologic methods, but the results of such tests may or may not bear any relation to the usefulness of the product. Of what value is it to know that a certain serum gives a reaction in a certain dilution by means of complement deviation, agglutination, opsonic index determination, or a bacteriolytic determination, when we do not know that these reactions bear any relation to one another; or, what is more important, to the effect the serum may have on the infection against which it is expected to act?

A possibility that must not be lost sight of is that the establishment of a standard may result in the fixing in the minds of workers and manufacturers the feeling that, as regards the particular product, there is no need for improvement. If a thing conforms to a government standard, why try to improve it?

A factor that must be considered in discussing the standardization of biologic products is the rate of deterioration. It is not too much to say that we know almost nothing of this, barring the two antitoxins for which we have potency standards. This absence of information has led to great variation in "expiration" dating for the same product. To remedy this, some manufacturers place the date of manufacture on the label, leaving to the purchaser the determination of the wisdom of using the preparation. There is justification for this, on account of the fact that the man-

ner in which products are kept influences deterioration. The serum or vaccine displayed on the pharmacist's shelves, or stored in a drawer, loses its efficacy much faster than one kept in an adequate refrigerating device. If the purchaser knows the age of a preparation, he may be in some position to judge of its probable value, when kept under given conditions.

SUMMARY

From the foregoing it is evident that these questions have already claimed much attention, and that the subject of standardization may be thus summarized:

The chief difficulty in standardizing biologic products is due to the unstable nature of the factors.

Legal standards have been established for diphtheria antitoxin and tetanus antitoxin. A provisional standard has been established for antityphoid vaccine.

Vaccine virus and antirabic virus are, in effect, tested for potency in the process of manufacture.

It is not wise to attempt to standardize products in the purely experimental stage, or those for which there is no sound scientific basis.

Those who are engaged in manufacturing and controlling these products are alive to the necessity for standardization.

COMPARISON OF METHODS OF TREATING WOUNDS

KENNETH TAYLOR, M.A., M.D.
Director, the Robert Walton Goelet Research Fund. American Red Cross Hospital of Paris

PARIS, FRANCE

The difficulty of judging and comparing the clinical results of different methods of the treatment of wounds is so great that it seems desirable to consider how more exact information as to the value of a treatment can be attained. It is obvious from a study of the literature since the beginning of the war that the superiority of no one form of treatment has become firmly established. The treatment of infection in wounds is thus still largely in the experimental stage.

The haphazard way of trying first one and then another method on each case, hoping to stumble on a suitable one, is as nearly barren of progress as is treating all wounds in the same way. This proceeding is not likely to lead to the recognition of the best methods of treatment for infected wounds. It is important, therefore, to organize in hospitals a system which may give a clear idea of what is being accomplished by each method of treatment.

As in most other therapeutic problems, the great difficulty in associating cause and effect lies in the number of variable factors which must be controlled. In the case of infected wounds, the first and one of the most important of these factors is the personal element in the manner of applying the treatment and handling the wound. It is of little use to compare two methods of treatment conducted by different men. No two surgeons will carry out the details of the same treatment in exactly the same way. One may secure satisfactory results by a certain method entirely from delicate and careful handling of the regenerating tissues of the wound, while another, using the same method of dressing, may counteract the benefits of the system by careless treatment of the young epithelium and granulations with which he is dealing. Yet both results may be ascribed to the particular method or dressing solution which is being used.

It is also unsatisfactory to compare the results of one method of treatment conducted in a series of cases with a different method used by the same surgeon in a previous series. It will often be stated that better results were obtained with the second method than with the first, when the difference is really due, not to a better method, but to the increased experience of wounds that has been gained by the surgeon.

There are other important factors which vary with the patient. First there is that of the *general vitality* and ability to react to the infection. Although this is not so great as might be supposed, owing to the fact that much of the military surgery deals with men more or less carefully selected for their sound health and freedom from debilitating disease, it cannot be entirely discounted.

The *age of the wound* and the previous treatment to which it has been subjected are also factors which must be standardized to be compared. This can partly be accomplished by establishing a system of periodic examinations and descriptions of each case at short intervals, and grouping the cases according to the number of *days since the injury* was received.

One of the most serious difficulties is encountered in the varying conditions within the wounds themselves. No two wounds can be safely considered to be exactly alike, although their external appearance may be very similar. Differences of *location and vascularity* may influence seriously the course of repair. The degree of *trauma*, both the obvious damage and the more subtle microscopic destruction of the soft tissues, is probably the most important of all the factors to standardize and yet the most difficult to estimate. Thus compound fractures are particularly unsatisfactory for study. The presence of *foreign bodies*, especially fragments of clothing and dirt, loose pieces of bone, etc., also alters materially the rate of repair; and, finally, the degree and kind of *infection*, which may vary with each patient, still further complicates the problem.

Although the difficulties of comparison are, as may be seen, great, there are certain methods by which cases can be arranged to reduce the number of the variable factors which confuse the issue and to give a more accurate comparison between them.

There are three ways in which these cases can be profitably studied. The first is by comparison of groups of selected cases. Each surgeon may collect under his service cases which have some points in common — for instance, open fractures, wounds of soft parts only, or cases of approximately the same age as to the injury. These may then be divided into groups, each set being treated in a different way.

Another system lies in a comparison of large groups of unselected cases. This is a logical but cumbersome method. The beds of the service may be divided into two or more groups, each treated by a different method, and patients sent to each group on entry, in rotation. Thus there would be no choice of treatment for a particular case as the result of a preconceived idea of suitability, but the distribution would be purely automatic. Owing to the great variety of patients on each method of treatment, it is necessary to continue the system for a long period of time and in a large number of cases in order to form any satisfac-

tory idea of the characteristics of each form of treatment.

The third, and by far the most satisfactory, system of comparison, one which eliminates the largest number of variable factors, is the treatment of two or more wounds in the same individual by different methods. This has the great advantage of eliminating variations in individual reaction on the part of the patient; also it is probable that the two or more wounds are of the same age and have been subjected to similar treatment up to the time the patient was received. The bacterial infection is apt to be similar. They are treated by the same surgeon. This leaves uncontrolled only the individual variations of the wounds. One case of this sort is worth a comparison of many cases in different individuals, and the special characteristics of the treatments in use can be determined. A separate history and description of each wound should be kept, and the progress of repair and the extent of infection recorded at regular intervals.

What points should be considered in judging the efficacy of a treatment?

The estimation of the ultimate success of any treatment must be based, of course, on the rate of repair of the injured tissues, that is, the *time required for the cure*. As corollaries to the rate of repair, the severity of the systemic reaction to the infection and the *frequency of complications* must be taken into account.

It is necessary to have some definite standards of judgment to apply in order to estimate accurately the results. The time factor must be standardized. Considerable information can be obtained by a systematic, *periodic* examination of the wound, and the observation, at regular intervals, of the rate of growth of the granulations and epithelium, the disappearance of sloughs, and the evidence of bone repair. A form of chart devised for the standardization of this information permits of an intimate association of the systemic reaction with the daily course and treatment of the wound.

Measurements of the wound surface are difficult to obtain accurately, but should be kept when possible in the case of open wounds. The type of scar resulting from the wound must be taken into account. This is more or less dependent on the rate of repair—the more rapid the repair, as a rule, the softer the scar. During the coarse of treatment, any damage to the tissues resulting from the method of treatment must be noted. A painful dressing is usually an indication that new tissues are being injured. Burning and blistering of the skin in the region of the wound, or the erosion of new epithelium, may materially retard the whole healing process. The evidences of absorption of toxins, as manifested by the fever reaction and the general comfort of the patient, must be considered.

The frequency of extension of the infection must be charged against the treatment. Pocketing, or the retention of purulent discharge, is usually evidence of unsatisfactory drainage resulting from the improper distribution of tubes or the use of some material which becomes easily plugged by the discharge. Local cellulitis may be due to the same cause. Erysipelas, pyemia or bacteremia are evidences of unsatisfactory treatment. Secondary hemorrhage must also be considered an avoidable complication, and is often due to improper treatment.

A further point of considerable importance which must be considered in judging the efficacy of a treatment is the alteration in the bacterial flora of the wounds dependent on it. This must be compared with the natural alteration which occurs spontaneously during the course of repair in every wound. The unusual disappearance of special bacteria from a suppurating wound under treatment may be evidence of the specificity of the antiseptic dressing solution for those bacteria.

The frequency of reinfection of the wound by any one organism (the *Bacillus pyocyaneus* is the commonest example) must also be taken into account in establishing the characteristics of a method of treatment.

The discharge should be kept under observation; record should be made of its amount, consistency, odor and color. There is a great tendency to place too much importance, however, on a superficial consideration of the discharge. The discharge is interesting chiefly as a symptom of an infective process. After it reaches the surface of the wound it is of little importance to the patient. Certain dressing solutions are claimed to "suppress suppuration." True suppression of suppuration may be a sign of failure to react to the infection, and then gives a bad prognosis to the case. There is, however, another process—that seen with the use of hypochlorite solution—on which great importance is sometimes placed as evidence of a decrease in the infection of the wound. This is the dissolving and decolorizing of the solid constituents of the discharge as a result of the alkali and chlorin freed from the solution. The infection and the reaction of the tissues may remain unaltered, that is, the activity of the bacteria remain the same within the granulations, and the leukocytes continue to emigrate at the same rate from the infected walls, although the character of the pus seen on the dressings may change from a thick purulent discharge to a thin, serous and colorless fluid giving an entirely different appearance to the surface of the wound. If the solution is withheld for twenty-four hours the pus cells reappear—a reaction which has been taken as evidence of reinfection. This alteration in the discharge, which has nothing to do with suppression of suppuration, may give what is really an optical misinterpretation of the true conditions within the tissues.

Exact observations on the particular effects of different methods of treatment are especially important on account of the confusion existing in the management of infected wounds. This study has rarely been carried out in a critical, scientific spirit.

It is only by comparing methods of treatment and keeping systematic observations of the wounds at regular intervals, and with a proper understanding of the true value of the changes in and about the wound, that the characteristics of any one method of treatment can be established, and an accurate judgment of its efficiency be made. Only then can dressings be applied intelligently, with a specific purpose in mind, and, according to definite indications, to particular cases.

6, rue Piccini.

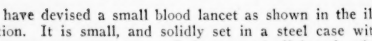
The Age of Insects.—The naturalists tell us that this would be the Age of Insects if it were not for man. And man's supremacy over the insects is not such a matter of course as is generally believed, to say nothing of their allies, the spirochetes, bacteria, et al. To the intervention of the rat flea may be credited the deaths from plague which in two years in India killed more persons than have been killed in the world war to date.

Clinical Notes, Suggestions, and New Instruments

A NEW BLOOD LANCET

IRVING F. STEIN, M.D., CHICAGO

I have devised a small blood lancet as shown in the illustration. It is small, and solidly set in a steel case with a screw-top protecting cover. It has proved efficient for drawing an adequate droplet of blood from the ear or finger tip.



New blood lancet.

It costs twenty-five cents—half the amount of the instrument usually used for this purpose. It will easily fit into any hemacytometer case, and is convenient to carry in the vest pocket.

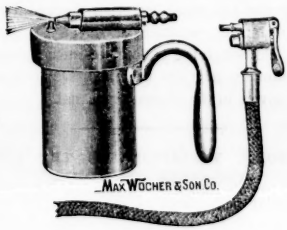
A NEW PARAFFIN SPRAY APPARATUS

JOHN A. CALDWELL, B.S., M.D., CINCINNATI
Fellow of the American College of Surgeons; Assistant Attending Surgeon, Cincinnati General Hospital.

The use of the various paraffin wax mixtures in the treatment of burns and other extensive granulating wounds seems to have proved a distinct advance in the treatment of this class of wounds. The two methods of applying the wax are by brush and by spray. The brush method has been rather unsatisfactory (especially with children) because the preparation must be applied too hot for comfort, and the redipping of the brush contaminates the original supply.

Many sprays have not given satisfaction because the hot wax is congealed at the outlet by the passage of the cold air jet through the spray nozzle.

With the assistance of Mr. Max Schmidt of the Max Wocher Company, and his workmen, I have made a spray which has given perfect satisfaction during several weeks' practical use on the wards of the Cincinnati General Hospital. The result has been accomplished without the use of complicated and capricious electrical heating device or hot water jacket. The illustration gives a full idea of the principle of construction.



Apparatus for spraying paraffin.

This spray is simply a modification of those which have been in general use in the arts for several years for spraying varnishes, paints and glazes on pottery. The sole modification consists in making the top from which the air and wax nozzles project sufficiently heavy to retain the heat. The reservoir holds 16 ounces—enough to spray several wounds of large area—and this quantity when thoroughly heated will remain fluid for a long time.

The device filled with the wax is placed in a sterilizer or covered vessel partially filled with water, and the water is boiled until the wax is heated to the temperature of boiling water. A layer of wax is then sprayed over the thoroughly dried wound. A single layer of gauze is then spread over the wax surface and sealed to it by further spraying. The gauze facilitates the removal of the wax on the following day.

A compressed air reservoir delivering a free flow of air at a pressure of not less than 20 pounds to the square inch is necessary. A tank holding 5 gallons and a hand or foot pump will work, but of course a power pump is much more satisfactory.

Other advantages of this spray to be noted are that all tubes and nozzles are straight, so that if they become clogged they may be easily freed, and also that the siphon type of spray will receive the wax at a temperature of 212 F., and when sprayed at a distance of 2 inches from the wound it reaches the surface sufficiently cool to cause no discomfort. In actual use we have been able to spray three patients in succession without reheating the apparatus.

My experience so far has not been sufficient to justify reports on the treatment except to state that it constitutes the most convenient method for the physician or the nurse, and the most comfortable for the patient.

350 Ludlow Avenue.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLE HAS BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, SECRETARY.

ARSENPHENOL-AMINE-S. — $NH_2.OH.C_6H_3.As:As.C_6H_3.OH.NH.(CH_2O)OSNa$.—A mixture of sodium 3-diamino-4-dihydroxy-1-arsenobenzene-methanal-sulphoxylate, with inert inorganic salts. The arsenic content of 3 parts of arsenphenol-amine-S. is approximately equal to that of 2 parts of arsenphenol-amine hydrochloride.

Actions, Uses, Dosage, and Physical and Chemical Properties.—The same as those of neosalvarsan (see New and Nonofficial Remedies, 1917, p. 43).

Neodiarsenol.*—A proprietary brand of arsenphenol-amine-S.

Manufactured by the Synthetic Drug Company, Toronto, Canada (The Diarsenol Company, Limited, Toronto, Canada). Canadian patent No. 144,874. U. S. trademark Nos. 90,128 and 90,129.

Neodiarsenol, 0.15 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.15 Gm.

Neodiarsenol, 0.3 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.3 Gm.

Neodiarsenol, 0.45 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.45 Gm.

Neodiarsenol, 0.6 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.6 Gm.

Neodiarsenol, 0.75 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.75 Gm.

Neodiarsenol, 0.9 Gm. Ampoules.—Each hermetically sealed ampule contains neodiarsenol, 0.9 Gm.

* Neodiarsenol is accepted for New and Nonofficial Remedies, as the available supply of neosalvarsan appears to be insufficient to meet the demand, and this preparation conforms to the rules of the Council for acceptance of proprietary preparations. Neodiarsenol is made in Canada under a license issued by the Commissioner of Patents of Canada. The Farbwerke Hoechst Company, however, announces that the sale of brands of arsenophenol-amine-S. other than that sold as neosalvarsan is, in its opinion, an infringement on its rights, and has stated that all violations of these rights will be prosecuted under the law.

Brass Band Methods and Typhoid Fever.—A cry of "Mad Dog!" will fetch out all who hear, and excite instant measures for the destruction of the dog by the bold, and self-protection by the timid. But let men parade the streets with steam-calliopes and exhibit banners appealing for public health funds *sufficient* to exterminate typhoid fever, and not 1 per cent. of that amount will be voted for. Yet one has a better chance to avoid a mad dog than typhoid fever.—E. A. Ayers, M.D., *Public Health News*, New Jersey.

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SATURDAY, AUGUST 4, 1917

THE PANCREAS AND FAT ABSORPTION

Since the early scientific researches of Claude Bernard,[1] it has been known that the pancreas is concerned in some way with the utilization of fats in the body. When the fat-digesting properties of the pancreatic juice were duly appreciated, a possible explanation for the phenomenon of suggested interrelationship between the pancreas and fat absorption became available. Lack of pancreatic secretion thus might mean failure of fat digestion and consequent utilization. This is emphasized by the fact that when the pancreatic juice is experimentally diverted from the alimentary tract, fats used in the diet almost invariably appear in the stools, though the failure of utilization is by no means always complete.

Recently it has been suggested that, so far as the utilization of fat is concerned, the mere exclusion of the pancreatic secretion from the intestine is not precisely equivalent to the loss of the entire function of the pancreatic gland as it occurs in extirpation or in various forms of atrophy of the organ. Lombroso, for example, declared that a considerable portion of ingested fat might still be absorbed after all direct communication between the pancreas and duodenum was supposedly interrupted; but if complete depancreatization had been effected there was either little or no absorption of fat from the intestine. Such evidence was adduced in favor of the hypothesis that the pancreas may be involved in interruption of the natural process of fat metabolism not only by lack of participation of its external secretion — the pancreatic juice — in the intestinal processes, but also by delivering to the blood an "internal secretion" by which fat transformation ordinarily is modified in some way. Thus the pancreas was conceived to influence fat utilization in somewhat the same way as it is believed to regulate or modify carbohydrate metabolism.[2]

Von Fürth[3] pointed out, in commenting on this belief, that properly to interpret this idea one should keep especially in mind that total pancreatic extirpation is a serious interference which results in an inexpressible wasting of the body. It might be asked properly whether, when "everything is upset" in metabolism in sequence, it really is a matter of much wonder that the fat digestion should also become disordered. He adds that offhand there does not seem to be any insistent reason for ascribing to the internal secretion of the pancreas, besides its dominant part in the metabolism of sugar, a second analogous cardinal function in relation to the metabolism of fats. Disturbances of the latter process, after complete pancreatic extirpation, can be fully explained in the first place by the failure of its external secretion, and in the second place by the general disturbance of the economy which severe pancreatic diabetes brings with it.

A direct study of the problems involved has been undertaken on animals in the Laboratory of Medicine at the Harvard Medical School by McClure, Vincent and Pratt.[4] They also assert that the absorption of fat by the intestinal mucous membrane is always markedly disturbed when the pancreatic secretion is excluded from the intestine. They found that dogs with a subcutaneous transplant secreting and discharging pancreatic juice externally absorbed no more fat than dogs in which a pancreatic remnant was undergoing rapid atrophy and sclerosis. This shows that the condition of the pancreatic tissue remaining in the body does not influence the amount of fat absorbed by the intestine. The new investigations show further that even after complete removal of all pancreatic tissue the absorption of considerable amounts of fat can still take place. This need not cause surprise now since it is asserted that the gastric secretory apparatus, as well as the intestinal secretion derived from nonpancreatic sources, produces a fat-digesting enzyme, or lipase. Although the pancreatic juice appears to be the predominant, it is not the exclusive source of fat-digesting power in the alimentary canal.

1. Bernard, Claude: Mémoire sur le pancréas et sur le rôle du suc pancréatique dans les phénomènes digestifs, particulièrement dans la digestion des matières grasses neutres, Paris, 1856.
2. Compare Gross, O.: Deutsch. Arch. f. klin. Med., 1912, **108**, 106.
3. Von Fürth, O.: The Problems of Physiological and Pathological Chemistry of Metabolism, Philadelphia, 1916.
4. McClure, C. W., Vincent, B., and Pratt, J. H.: The Absorption of Fat in Partially, and in Completely Depancreatized Dogs, Jour. Exper. Med., 1917, **25**, 381.

PERIODIC VARIATIONS IN THE LIFE PROCESSES IN WOMEN

The regular occurrence of the menstrual period in women is one of the indisputable evidences of a rhythm of functional activities in the human organism. Menstruation is presumably associated with comparable periodic changes in the condition of the ovaries, though there is a difference of opinion as to the exact relations between ovulation and menstruation. Cycles of performance, alterations of rest and activity, are familiar in the daily routine of all persons; but the extent to which more far reaching though normally regular variations or recurrences of physiologic states of

unlike character may be found in nature is not easily answered.

The theory that the life processes of women have a demonstrable rhythm which centers about the menstrual period was suggested in 1876 by Dr. Mary Putnam Jacobi.[1] Her observations on the pulse, temperature, blood pressure and muscular strength have been repeated and extended by other workers. In general, the conclusions have been that the highest point in all of these processes is reached from two to three days before the onset of the menstrual period, and that they sink to the lowest point at its close, gradually rising to normal during the intermenstrual period.

Several years ago Dr. Jessie L. King[1] of Goucher College, Baltimore, undertook to verify some of these generalizations by methods of physiologic and clinical measurement. Her studies of the pulse and temperature of young women tend to support this usually accepted theory of a rhythmic alternation in the life processes. The highest point was reached at from three to four days before the menses, the lowest about three days after their cessation. Blood pressure records gave such irregular statistics that they could not be adduced in support of the rhythm hypothesis.

The variations in pulse and temperature, though apparently unquestionable, are slight at most. They alone would scarcely appear to afford any adequate explanation of the feeling of discomfort frequently experienced by certain apparently normal women immediately preceding and at the onset of the menstrual period. This has raised the question as to whether there may not be a corresponding variation in the tone of the nerve centers.

Dr. King[2] has recently reported a series of observations on a group of normal young women over periods varying from one to five menstrual cycles in which the knee jerk was used as an index of such tone. The evidence points in the direction of the conclusions that a period of hyperexcitability immediately precedes or accompanies the onset of the menstrual period; that this is followed by a decline in excitability which continues for a few days after the menses have ceased, and that there is then a tendency for it to rise to a slightly higher level than the preceding during the intermenstrual interval.

If the mental depression and physical fatigue which are so often associated, rightly or wrongly, with the approach of the menstrual period are based on substantial physiologic variations of the bodily states and performances, it is important to have a detailed analysis of them for social and economic as well as for more immediately scientific reasons. It may be well, however, in the absence of more extensive data of a strictly objective value, to bear in mind Dr. King's earlier conclusion that there has been a tendency to overemphasize the inefficiency of women during the menstrual period. To quote her own words:

> Granted that lowering in pulse rate, temperature and blood pressure occur during the menstrual and postmenstrual periods, should much significance be attached to a diminution in pulse rate of from two to three beats, to temperature variations rarely greater than 1 degree, and to blood pressure changes averaging from 2 to 5 millimeters? Certainly one would suppose that in a healthy individual a normal periodic function should not be accompanied by a marked depression in all of the life processes and a generally lowered efficiency so emphasized by numerous writers. If there is a compensation for the loss of blood by the retention of nitrogen, then it would seem that there should be a compensation in the cardiovascular system, and this is indicated in the tendency of the blood pressure to show such slight variations.

1. Jacobi, Mary P.: The Question of Rest for Women During Menstruation, Boylston Prize Essay, 1876. This is cited from a paper by Dr. Jessie L. King (Concerning the Periodic Cardiovascular and Temperature Variations in Women, Am. Jour. Physiol., 1914, **34**, 203), from which some of the statements given above are extracted.

2. King, Jessie L.: Possible Periodic Variations in the Extent of the Knee-Jerk in Women, Proceedings of the American Physiological Society, Am. Jour. Physiol., 1917, **42**, 607.

THE DIASTATIC ACTIVITY OF THE BLOOD IN DIABETES

The increasingly successful application of chemical methods to the clinical examination of the blood has decidedly enhanced the diagnostic and prognostic possibilities of practical medicine. Estimations of blood sugar, nonprotein nitrogen and chemical factors, such as the carbon dioxid combining power of the plasma conditioned by acidosis, stand out as conspicuous examples of the service of modern biochemistry in clinical work. Numerous additional instances might be cited in which the deserts of new procedures and the merits of new analytic methods applied to the study of the blood must remain in abeyance until more facts and further critique are available. In illustration one may recall the content of cholesterol and other lipoids, of amino-acids and other simple nitrogenous compounds in the blood in relation to health or disease.

The existence of a variable starch-digesting power on the part of the urine has long been known. In recent years, attempts have been made from time to time to associate the variations in the quantity of the urinary amylase with altering physiologic states as expressed in the functional capacity of the kidneys or in the activity of the pancreas from which the enzyme was believed to be derived. C. E. King,[1] who conducted elaborate studies on blood and urinary amylase at the University of Chicago, has remarked that it is not surprising that amylase elimination has not been more generally adopted as a diagnostic measure, if we take into consideration that the physiologic conditions governing the elimination of enzymes, as well as their actual source, are not definitely known. As starch-digesting enzyme, or amylase, is secreted by both the salivary and the pancreatic glands, one naturally assumes at the outset that the enzymes from them somehow find their way into the blood and thus into the urine. The appearance of the enzyme there

1. King, C. E.: Studies on Blood and Urinary Amylase, Am. Jour. Physiol., 1914, **35**, 301.

is conceivably due to absorption from the alimentary tract or to direct passage from the gland tissue to the blood stream. King believes that both paths are followed; but he adds that the digestive glands pouring amylase into the alimentary tract are not the only source of enzyme finding its way into the urine.

There are variations in the amylolytic power of urines from different individuals not accounted for by differences in diet. Lesions causing obstruction to the natural outflow of the pancreatic juice lead to an increase of amylase in the urine. Traumatic injury to the pancreas results in an increased amylolytic power of the urine. Pancreatectomy results in a decrease in urinary amylase. The amount of amylase in the urine depends on the amount finding its way into the blood, and on the functional capacity of the kidney. King ventures the belief that the amylase in the blood and urine plays no important rôle, but, having found its way into a medium normally containing no substrate, is destined to destruction and elimination.

Myers and Killian[2] have avoided some of the uncertainty as to the quantitative significance of circulating amylase by disregarding the kidney factor. Their studies at the New York Post-Graduate Medical School and Hospital have been directed primarily to the diastatic properties possessed by the blood. Its amylase content is evidently increased in almost all instances of pronounced diabetes and likewise in nephritis. It is suggested that the increased diastatic activity in both diabetes and nephritis (as shown by the analyses of the blood) may be the important factor in the production of the hyperglycemia in these conditions. The increased diastatic activity of the blood in nephritis finds probable explanation in the decreased excretion of diastase in the urine, now well known in this condition; but it is not possible, at present, to offer a satisfactory explanation of the increased diastatic activity of the blood in diabetes. This activity, however, may explain the inability to secure storage of glycogen in the liver of diabetic animals. If we accept the conclusions of Myers and Killian, a decrease in the blood diastase may afford a more reliable guide to the efficacy of the dietetic treatment in diabetes than either the blood sugar or urine sugar. Furthermore, an increase in blood diastase may constitute a very early sign of impending diabetes. These suggestive investigations need extension and corroboration, however, before their real significance can be evaluated.

2. Myers, V. C., and Killian, J. A.: Studies on Animal Diastases, I, The Increased Diastatic Activity of the Blood in Diabetes and Nephritis, Jour. Biol. Chem., 1917, **29**, 179; Proc. Am. Physiol. Soc., Am. Jour. Physiol., 1917, **42**, 582.

The Origin of Concave Spectacles.—Within two hundred years from the first statements in the Opus Majus (Roger Bacon) concerning the use of convex glasses for old men, mention becomes more and more common of concave glasses for the myopes, and from 1568 onward convex and concave spectacles have a fixed place as aids to vision.—S. H. Gage.

Current Comment

IS BILE ITSELF A CHOLAGOGUE?

The review of the assertions of Hooper and Whipple of San Francisco that there is no "circulation of the bile" in the sense in which this expression is usually interpreted, and that feeding fresh bile fails to cause any augmentation of the output of bile pigments[1] may tend to raise a question as to whether bile itself is, after all, a true cholagogue. In early years an enhancing effect on biliary secretion was ascribed to diverse chemical agents. Calomel, rhubarb, jalap, turpentine and olive oil, among many other therapeutic products, received favorable mention. With the introduction of more careful methods of observation and an appreciation of the previously underestimated irregularities in biliary secretion under the casual conditions of many earlier experiments, many of the original claims have been abandoned as untenable. Schiff's view, that bile absorbed from the alimentary tract increases the secretion of bile and thus acts as a true cholagogue, seems to have been well established. Hooper and Whipple[2] have found that even though there may be a fall in the output of the bile pigments, feeding fresh bile to bile fistula dogs causes an almost constant cholagogue action. Bile of the dog, sheep and pig all has this effect, and ox bile seems to be the most active cholagogue. A separate investigation of some of the individual components of the bile by Hooper[2] showed that glycocholic acid has a moderate cholagogue action, but usually causes a great drop in bile pigment output in a bile fistula dog. Taurocholic acid has a strong cholagogue action, but little, if any, inhibiting effect on the bile pigment secretion. Bile fat (ether extract of whole bile) has no influence on bile flow, but causes inhibition of bile pigment secretion. Cholic acid has little effect on bile flow, but may decrease somewhat the bile pigment output. This indication of the potency of the bile acids in promoting biliary output is a substantiation of observations first recorded long ago.

WATER ECONOMY AND HEAT REMOVAL IN THE HUMAN ORGANISM

Warmth is one of the products of metabolism. As our body temperature is maintained at a remarkably constant level, despite the wide range of variations in the temperature of the environment and the other shifting conditions of climate, an efficient regulatory device is essential. Among the factors of the physical regulation of temperature, the loss of heat by vaporization of water from the lungs and skin has long been recognized to play a conspicuous part. As the surrounding temperature grows lower, conduction and radiation can serve as paths for the heat dissipation. At a low temperature there is little evaporation of

1. Hooper, C. W., and Whipple, G. H.: Bile Pigment Metabolism, IV, Influence of Fresh Bile Feeding upon Whole Bile and Bile Pigment Secretion, Am. Jour. Physiol., 1917, **42**, 264. The Life of the Red Blood Corpuscles and "Bile Circulation," editorial, THE JOURNAL A. M. A., June 16, 1917, p. 1819.

2. Hooper, C. W., and Whipple, G. H.: Footnote 1. Hooper, C. W.: Bile Pigment Metabolism, V, The Influence of Bile Constituents on Bile Pigment Secretion, Taurocholic, Glycocholic and Cholic Acids and Bile Fat, Am. Jour. Physiol., 1917, **42**, 280.

water. On the other hand, with a rise in the external temperature the other physical processes fail to participate as largely in the removal of heat, so that when a temperature of 37 C. (98.6 F.) is reached, water evaporation provides for practically the entire loss of heat, unless perchance the temperature of the body rises. Pathology is obviously concerned with these mechanisms. In fever, for example, special needs for the elimination of heat may be created. Long ago it was believed, particularly by von Leyden, that water retention in fever plays an important part in the pathology of the latter condition, although the phenomenon is not regarded as specially characteristic of fever alone at the present time. In view of the limited number of facts regarding the water economy of the organism, so far as it relates to heat removal, an unusual value is added to the determination of water elimination in 300 experiments in the Sage respiration calorimeter at Bellevue Hospital, New York.[1] They were carried out for the most part under standard conditions of climatic environment represented by an air temperature of between 22 and 24 C. (71.6 and 75.2 F.) and a relative humidity of from 25 to 50 per cent., the persons being lightly clad. Thirteen normal men were thus found to give off, on the average, 29 gm. of water (approximately 1 fluidounce) an hour through the vaporization of water from the skin and the respiratory passages. Twenty-four per cent. of the heat calories were lost in this way. These average results are reported to agree closely with the figures obtained under circumstances more divergent from the normal, as figures obtained from experiments on men after large meals of sugar or protein, on boys of adolescent age, on very old men, on dwarfs, and in a variety of diseases, including diabetes, pernicious anemia and cardionephritic maladies. They are accordingly fairly representative of the body's usual performance in this feature of the regulation of temperature. These factors, particularly as they show that about one quarter of the heat produced is lost under ordinary conditions of health and climate by the channels indicated, apparently have not been heretofore so extensively and carefully ascertained.

1. Du Bois, E. F., and Soderstrom, G. F.: The Vaporization of Water from Skin and Respiratory Passages in Health and Disease, Proceedings of the American Physiological Society, Am. Jour. Physiol., 1917, **42**, 604.

NEW YORK EVENING POST STARTS CAMPAIGN AGAINST VENEREAL DISEASES

At this time, when hundreds of thousands of the picked young men of the nation are being called to concentration camps, it is not only advisable but imperative that we realize the dangers to which our soldiers will be exposed unless definite and stringent methods for the suppression of organized vice and the control of venereal infections in military camps are instituted at once and rigidly prosecuted. Probably no class of diseases has levied as heavy a toll on military forces in all wars and in all campaigns. A soldier incapacitated by venereal infection is not only useless from a military standpoint but he is dangerous to his comrades through the possibility of spreading infection. Our nation is making every effort to organize, train, equip and send out the most efficient force in the shortest possible time. To do this, we must utilize every available means for the prevention and control of those diseases which may incapacitate thousands of men. This is possible only through an aroused public sentiment which will demand the utmost measure of protection for the young men called to military service. It is, therefore, particularly gratifying to note that one of the leading New York newspapers — the *Evening Post* — has announced a definite editorial policy, looking to the arousing of public sentiment and the creation of public support for the prevention and control of venereal diseases. In its issue for July 14 appears a lengthy special article on the dangers of venereal disease and an announcement that the *Post* has not only abandoned the attitude of the majority of newspapers on this subject, which it designates as a "conspiracy of silence," but that it has laid out a definite program of public education on the prevention of venereal diseases. In its issue for July 21, appears a second article based on the report of the Massachusetts State Department of Health, and showing the dangers of syphilis as compared to typhoid, smallpox and other diseases. Additional articles are to appear each Saturday. In taking up this task, the *Evening Post* is performing a valuable service which should meet with the unqualified support of all good citizens and with the support and cooperation of all physicians, and which should go far, by example, in doing away with the attitude of most of our newspapers in ignoring or refusing to discuss one of the most vital public health problems of our day.

An Effective Plan of Social Hygiene.—The Massachusetts Society for Social Hygiene after five years of work has decided that its most effective efforts are educational. It confines its efforts to teaching in quiet ways such parts of sex or social hygiene as may be expected to diminish the amount of sexual transgression and vice, and to check the spread of venereal diseases. As set forth in the *Public Health Bulletin* of the State Department of Health of Massachusetts, April, 1917, the society's methods of work are as follows: Two paid agents are employed, both of whom have been practicing physicians, one a man and the other a woman. They give all their time to correspondence, to talking to small groups of boys and young men, girls or young women, or fathers or mothers assembled under the auspices of schools, colleges, clubs, associations, settlements, churches, friendly societies, young men's or young women's Christian associations, women's clubs, men's clubs, and to advising the numerous inquirers who come to the office of the society. The sexes are talked to separately, for the most part. Four physicians give their services gratuitously in lectures to groups of men or occasionally to mixed groups. The field for this work is said to be wider than the society is able to cultivate. A lending library of carefully selected books on social hygiene and related subjects is maintained, which is much used at the office and by groups to whom lectures have been given. A reading list prepared by the society is distributed in thousands of copies, some of which are given out by the public health nurses. The officers of the society are Prof. Charles W. Eliot, president; David L. Edsall, M.D., vice president; Ernest B. Dane, treasurer; Irving E. Stowe, M.D., secretary. The office and library of the society are at 50 Beacon Street, Boston.

Medical Mobilization and the War

TEXTBOOKS DEALING WITH THE ADVANCE OF MEDICINE AND SURGERY DURING THE WAR

EDWARD MARTIN, M.D.
Chairman, Editorial Committee, General Medical Board
WASHINGTON, D. C.

The intensive training to which some thousands of the civilian doctors who have entered the Army are now being subjected excites, in the minds of those who know how thoroughly this has been organized and is being administered, nothing but unqualified admiration. It must be assumed, and usually with justice, that these men have all received an adequate medical education, that they are qualified to meet the calls incident to civilian professional life. It is equally clear that, with the exception of a very few who have had experience at the front, they are entirely ignorant of the new problems introduced as a result of the present methods of warfare and the terrain on which it is conducted, and that the medical and surgical knowledge gained by the three years of experience on the western and eastern fronts has come to them only in fragmentary, disconnected and often confusing ways through current literature or by word of mouth on the part of those who have had a limited chance for observation; from which it follows that in the final education of these Army surgeons, it is of vital importance that the results of the experience gained, often at frightful cost, should be systematized, formulated, condensed and digested in the shape of a text which shall serve as the basis of their technical education.

This text should cover hygiene; it should present a broad general view of military surgery as practiced at the present time; it should cover infections and the treatment of wounds; fractures and the lesions of joints; the methods of first-aid dressing; the treatment to be applied at the advance dressing station, where only the immediate needs of the hour can be met; the treatment to be applied at the field hospital, where the first complete and surgical treatment is practicable.

The problems of the base are not of such urgent need from the immediate educational standpoint, since they will, in the main, be taken up by technicians already trained.

The profession will be glad to know that arrangements are being made for a collection and proper presentation of the best and most recent thought and practice bearing on medical and surgical military problems.

The Editorial Committee of the General Medical Board of the Council of National Defense, in cooperation with the Surgeon-General's office, which has the largest representation on this committee, has, with the authorization of the Secretary of War, arranged for a series of hand-books of such size as can readily be carried in the pocket, corresponding closely with the Manual of Drill Regulations, each intended to cover a fundamental subject from the standpoint of the immediate needs of the military surgeon.

If the preliminary summarization and digestion of current literature prove satisfactory, the collator may be sent over for a final study at the front and for consultation with those of largest experience and who have been most successful. During this period the manuscript will be put in shape for publication, will be returned and finally passed on by the Surgeon-General's office, and, if approved, will be issued as a manual which will serve as a text in the education of the military surgeon.

The committee has already approved "Military Hygiene," by Major Vedder; "War Surgery," by Dr. Stimpson, and "Medico Military Service," by Colonel Goodwin, and has in course of preparation "Infections," "Wounds of the Head and Trunk," and "Wounds of the Extremities."

The new Army surgeons should be sent to the front with an accepted standard antiseptic or antiseptics, with an accepted standard technic, in which, before their going, they may be thoroughly drilled.

In addition to the textbooks, and supplementing them, Major Munson has arranged for a series of illustrated lectures by men prominent in the profession, and for practical demonstrations of splints, traction and other mechanical measures so constantly called for in modern war.

It is the hope that our surgeons, thus educated to the hour, may not suffer by comparison with our English and French brethren, who possess the priceless advantage of a larger experience.

The Medical Officer and His Rank

The lowest rank held by a medical officer is that of first lieutenant. As such he is entitled to salute by second lieutenants, sergeants and corporals, as well as by privates of the line. If there is anything that "gravels" even a second lieutenant it is this demand of the service. At one of the training camps for officers of the line and for medical reserve officers, the latter have become accustomed to the somewhat satirical salutes and gibes of the embryo line officers. The "medics" retaliate by good-natured advice to the "boy-scouts." One of the students in the line training camp said: "The hardest thing we have to do is to salute those fellows (the medical officers). They can't march, they salute funny and they are not soldiers anyway you look at it." The attitude of these men who may some day be in a position to reject a suggestion of immense sanitary importance from the men who now amuse them is significant. Perhaps the cure for the problem lies in teaching the line officer the deeds of the medical department in the past, in impressing on him the lessons of the Mesopotamia tragedy, in convincing him that the greatest sacrifice on the altar of duty to one's country is made by the medical officer.

The Care of Soldiers' Dependents

The Children's Bureau has issued a report on the care of dependents of enlisted men in Canada, which is particularly timely, as this problem will soon become one of immediate importance in this country. The principle that some provision by the government or otherwise should be made for the dependents of those who are called on to serve their country is generally recognized, but, as is pointed out in Miss Lathorp's letter of transmittal, this tendency has developed entirely since the Civil War and is a part of the growing recognition of the responsibility of the state. The plans adopted by belligerent nations in Europe are interesting but hardly applicable to this country on account of different standards of living. In Canada, however, the situation is more nearly comparable to our own. The assistance extended by the Canadian government comes under two general classes, namely, pensions payable while in service and pensions payable after discharge. The dependents of an enlisted man may receive assistance from four sources. These are:

1. Assigned pay. Enlisted men are required to assign at least one half of their pay (not including field allowance) at the time of their enlistment, and are permitted to assign not more than twenty days' pay. Officers are not required to assign any definite amount.

2. Separation allowance granted by the Canadian government to dependents of volunteers. This varies from $20 a month for privates to $60 a month for lieutenant-colonels. No allowance is made for children in this arrangement.

3. Life insurance. In certain localities in Canada, families of enlisted men are protected by life insurance, the premiums on which are paid by the municipalities in which the volunteers resided at the time of their enlistment. The policies in most cases have been issued by insurance companies located in the United States. In Toronto, however, three fourths of the insurance is being carried by the city of Toronto itself, a $2,000,000 bond issue having been floated for this purpose. Every officer and enlisted man residing in Toronto at the time of entering the service has, from the date of his enlistment, a life insurance policy for $1,000.

4. The Canadian Patriotic Fund, incorporated. This fund, organized in 1914, renders assistance to families in need whose income from all sources is insufficient for their needs. The resources of the fund are derived from volunteer contributions and from grants made by the Provinces as well as cities and counties.

Applying these various means of relief to a specific case, the wife of a private having three children between the ages of 10 and 15 would receive the following sums monthly: assigned pay of a private, $15; separation allowance, $20;

Canadian Patriotic Fund, $25; total, $60. From Sept. 1, 1914, to April 20, 1917, nearly $17,000,000 was dispensed to soldiers' dependents, while over $6,000,000 was on hand for further distribution. Benefits payable after discharge include pensions in case of disabled men and payments during reeducation and preparation for self-support. Pensions range from $480 a year for enlisted men to $2,700 a year for brigadier-generals, there being six classes of disability ranging from 20 to 100 per cent. In case the soldier is killed or dies as the result of injuries received or disease contracted in active service, the widow is entitled to a pension and an allowance for children. This amounts to nearly as much as the pension for total disabilities, the allowance for the widows of all men below the rank of petty officers being $432 a year, with $66 additional for each child, that of the widow of a commodore or brigadier-general being $2,430 a year with an allowance of $108 for each child.

Much is being done to fit disabled and incapacitated soldiers for self-support. A military hospital commission has been organized which sees to it that the disabled soldiers go to the hospital home or sanatorium which will give them the most efficient treatment and restore them to the most complete condition of health possible. While under the supervision of the hospital commission, the soldier receives his regular pay and his family receives all allowances, he being regarded as still in active service. On being discharged from the hospital and the service, he is passed on to the board of pension commissioners, and the first pension instalment is paid him on the day that he is discharged. In each district a vocational officer keeps track of the discharged man. If it is found necessary to teach him a new trade, a course of instruction is outlined for him. While taking this course, he receives a pension, an allowance of $8 a month by the commission, his maintenance at one of its institutions or an allowance of a dollar a day if he lives at home, with a further allowance to his wife of the difference between the $35 a month and the pension paid to her husband. Allowances are also made for children at different ages, the whole forming a maximum of $55 a month for the wife and children and which with the $1 a day maintenance allowance and the $8 from the commission gives the family a total monthly income of $93. The pamphlet issued by the Children's Bureau also contains in the appendix pay and allowance tables, reports of the board of control of Toronto on insurance, the act incorporating the Canadian Patriotic Fund and numerous other laws, ordinances, tables and blanks of use in studying this subject.

Physicians Recommended for Commission in the Medical Reserve Corps

During the week ending July 21, 1917, 472 physicians were recommended for commission in the Medical Reserve Corps, the proportion being 6 majors, 57 captains and 409 lieutenants.

Special Service for Psychiatry and Neurology

Major Pearce Bailey, M. R. C., chairman of the Committee on Furnishing Hospital Units for Nervous and Mental Disorders to the United States Government, has been asked by the Surgeon-General to serve as personal advisor to the Surgeon-General in all matters pertaining to psychiatry and neurology.

Plattsburgh Soldiers Forbidden Vermont

On July 19, Colonel Wolf issued orders forbidding any members of the Plattsburgh garrison and training camp to visit the state of Vermont without written permission of the commanding officer because of the presence of infantile paralysis in that state. As yet no cases of this disease have been reported on the New York side of Lake Champlain.

Promotions in Naval Medical Corps

The Surgeon-General has recommended the promotions of three medical inspectors to medical directors; seventeen surgeons to medical inspectors and thirty-three P. A. surgeons to surgeons. The promotions are calculated on a basis of 489 as total strength of the corps. On July 1, the authorized strength of the corps was 824, and on this basis promotions would be ordered to bring the several grades to the following strengths: four medical directors with the rank of rear admiral; thirty-two medical directors with the rank of captain and sixty-six medical inspectors.

Commissions for Contract Surgeons

A bill was introduced in the House, July 3, by Mr. Hulbert, providing that acting assistant or contract surgeons, who have served under standard contracts at Army posts under Army contracts and who were not commissioned in the Medical Reserve Corps at the time of the passage of the Act of April 23, 1908, be commissioned as first lieutenants, Medical Reserve Corps, date of entry into service to be contingent on the authorization of the Surgeon-General for recommendation for active service in the Medical Corps, in case of necessity, any physician who has served as commissioned medical officer in volunteer service in the naval guard or militia or as acting assistant or contract surgeon for at least three months, providing that they are mentally and physically qualified to perform the duties required.

New Divisions in Public Health Service

House Bill, No. 5347, introduced by Representative Adamson, July 9, provides:

That there shall be established one additional division each of mental hygiene and rural sanitation in the United States Public Health Service, and said divisions shall be in charge of commissioned medical officers of the United States Public Health Service, detailed by the Surgeon General, which officers, while thus serving, shall be assistant surgeons general within the meaning of section three of the act approved July 1, 1902, entitled "An act to increase the efficiency and change the name of the United States Marine Hospital Service." Sec. 2. That the duties of the division of mental hygiene shall be to study and investigate mental disorders and their causes, care and prevention. The duty of the division of rural sanitation shall be to investigate improved methods of rural sanitation, and the prevention and suppression of comunicable diseases.

Netherlands Physicians Inspectors of Prisoner Camps in Germany

The *Nederlandsch Tijdschrift* states that until America declared war on Germany, some American physicians in Germany had been entrusted with the supervision of prison camps in Germany where English prisoners were confined. The inspection dealt with the hygienic conditions, the food and the medical treatment in the camps. After the United States withdrew from the neutral nations, the English government appealed to the Netherlands government to appoint two Netherlands physicians for the task. After some search, two physicians residing at 's-Gravenhage accepted the appointment and went to Berlin last March. One, however, Dr. E. A. Keuchenius, was deemed not neutral enough, and was obliged to return home. Dr. R. Römer, of the same town, formerly in the East Indies, was appointed in his place. The other member of the party is Dr. J. A. Rademaker.

Longevity Pay for Contract Surgeons

The Court of Claims has rendered a decision in the case of Lieut. Herbert W. Yeamans, M. R. C., U. S. Army, who, while serving as a contract surgeon, was appointed a member of the Medical Reserve Corps, and claimed that he was entitled to longevity increase for his services as contract surgeon, basing his claim on Section 9 of the act of April 3, 1908, which provides "That officers of the Medical Reserve Corps, when called on active duty in the service of the United States, as provided in Section 8 of the act, shall be subject to the laws, regulations, and orders for the government of the regular Army, and during the period of such service shall be entitled to the pay and allowances of first lieutenants of the Medical Corps with increase for length of service now allowed by law, said increase to be computed only for time of active duty." The Court of Claims holds that this legislation was prospective in its character and operation, and does not contemplate the computation of former service in fixing the longevity pay of officers rendering service in the Medical Reserve Corps; that the plain meaning of the language quoted is that officers of the Medical Reserve Corps shall only receive longevity pay while they are on active duty in the active service of the United States in the Medical Reserve Corps, and that no service performed elsewhere, even though performed in other branches of the military service, can be computed in determining the longevity pay provided for in this statute.

Orders to Officers of the Medical Reserve Corps

ALABAMA

To ALLENTOWN, PA., for duty, Lieut. L. A. Fox, Birmingham.

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieut. William L. Staggers, Birmingham.

To FORT SAM HOUSTON, Lieut. B. F. Adams, Fulton.

To report in person to commanding general, Southern Dept., for duty, Lieut. D. P. Dixon, Talladega.

To home from further active duty, Capt. John O. Rush, Mobile.

The resignation of Lieut. E. S. Sledge, Alabama N. G., Mobile, is accepted.

ARIZONA

To report by telegraph to the commanding general, Southern Department, for assignment to duty, Capt. J. E. Bacon, Miami.

ARKANSAS

To FORT OGLETHORPE, Lieut. L. Thompson, Hot Springs.

CALIFORNIA

To FORT BENJAMIN HARRISON for instruction, Lieut. Louis Felger, Los Angeles.

To CHICAGO, Major George F. Shiels, San Francisco, and Lieut. G. M. Hubbell, Los Gatos.

To FORT SAM HOUSTON, Lieut. J. H. Graves, San Francisco.

To ROCKEFELLER INSTITUTE, New York, N. Y., Lieut. J. R. Oliver, San Francisco.

To SAN FRANCASCO for duty, Major B. F. Heyden, Soldiers Home; Capts. E. A. Newton, Los Angeles; H. R. Green, Palo Alto; R. K. Hutchings, E. S. Kilgore, San Francisco; F. R. Fairchild, Woodland; Lieuts. H. E. Foster, Berkeley; E. R. Bridge, La Vina; R. L. Rierson, Oakland; C. F. Gelston, E. W. O'Donnell, and J. B. Spalding, San Francisco.

To WASHINGTON, D. C., for duty, Major W. F. Snow, Stanford University.

To HAWAII, for duty, Lieut. A. L. Davis, San Francisco.

CANADA

To ARMY MEDICAL SCHOOL, WASHINGTON, D. C., for instruction, Lieut. Donald Munro, Ontario.

To FORT BENJAMIN HARRISON for instruction, Lieut. E. A. Smith, Hornings Mill, Ontario.

COLORADO

To FORT DOUGLAS, Lieut. A. L. Beaghler, Denver.

To HAWAII for duty, Lieut. R. L. Drinkwater, Denver.

To report by telegraph to the commanding general, Southern Dept., for assignment to duty, Lieut. R. DeL. Wilson, Holly.

CONNECTICUT

To FORT OGLETHORPE for instruction, Lieut. John L. Kelly, New Britain.

DISTRICT OF COLUMBIA

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieut. Carroll E. Bingman, Washington.

FLORIDA

To ATLANTA, GA., Lieut. C. A. Andrews, Tampa.

To FORT OGLETHORPE for duty, Lieut. H. B. Cordes, Jr., and W. G. McKay, Jacksonville.

To WASHINGTON, D. C., for duty, Lieuts. Hyman M. Ginsberg, Pensacola, and John K. Johnston, Tallahassee.

GEORGIA

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Robert S. Wynn, Atlanta, and John A. White, Augusta; Roy A. Gunter, Jackson, and William G. Herrington, Nunez.

To ATLANTA, GA., Lieuts. W. P. Ellis, Gay; and O. E. Herndon, Powelton.

To COLUMBIA, S. C., Lieuts. C. E. Lawrence, Atlanta; and D. P. Belcher, Sale City.

To FORT MCPHERSON for duty, Capt. Richard R. Daly, Atlanta.

To FORT OGLETHORPE, Capt. Young A. Little, Milledgeville; Lieuts. Adrian D. Williams, Folkston, and Egbert M. Townsend, Tilton.

IDAHO

To ALLENTOWN, PA., for duty, Lieut. F. L. Cole, Rigby.

ILLINOIS

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Capt. Charles H. McKenna, Chicago; Lieuts. Julian N. Dow, Arcola; Asa R. Freeman, Blomington; Irving F. Barnett, Bernard P. Conway, Harry A. Dimond, Kendall P. Frost, Orlando M. Gochnaur, David A. Horner, Vincent F. Keller, Chicago; Elvin O. Brown, Clayton; Lawrence A. Ryan, East St. Louis; Percy P. Haslitt, Marshall, and William L. Smith, Toledo.

To FORT BENJAMIN HARRISON, Lieuts. J. C. Hall, Centralia; Guy E. Krolick; Arthur W. Wermuth, Chicago, and Charles F. Childs, New Boston.

To FORT RILEY for duty, Lieut. T. B. Knox, Quincy.

To HAWAII for duty, Lieut. C. S. Brewer, Fairburg.

To ROCKFORD, ILL., Lieuts. G. R. Allaben and H. Harvey, Rockford.

Par. 51, S. O. 145, June 25, 1917, War D., relating to Lieut. Imas P. Rice, Oak Park, is revoked.

To report in person to commanding general, Southern Department, Lieut. E. S. Adams, Chicago.

INDIANA

To FORT BENJAMIN HARRISON for duty, Lieuts. George H. Hockett, Anderson, and C. M. Williams, Kokomo.

To FORT OGLETHORPE, GA., Lieut. W. C. Moore, Anderson.

IOWA

To HAWAII for duty, Capts. F. G. Murray, Cedar Rapids, and A. V. Hennessy, Council Bluffs.

To DES MOINES, IOWA, Capt. J. J. Daly, Decorah; A. C. Hansen, Chester, and C. E. Ruth, Des Moines.

KANSAS

To FORT DOUGLAS, Lieut. W. R. Dillingham, Sabetha.

To FORT RILEY, Capt. W. A. Carr, Junction City; Lieuts. M. L. Belot, Clyde, and L. T. Simpson, Moran.

To ROCKFORD, ILL., Lieut. C. W. Hall, Cedar.

To report in person to commanding general, Southern Department, for duty, Lieut. J. C. Butler, Stafford.

KENTUCKY

To FORT BENJAMIN HARRISON for duty, Capt. J. L. Phythian, Newport.

To FORT OGLETHORPE for instruction, Lieuts. Edward Stumbo, Allen, and Lawrence F. Boland, Stone.

To LOUISVILLE, KY., Capt. Irvin Lindenberger, Fort Thomas; Lieuts. J. F. Cook and L. J. Ernstberger, Louisville.

To report in person to commanding general, Southern Department, for duty, Capt. W. B. Gossett, Louisville.

LOUISIANA

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Marvin Cappel, Alexandria; James A. Coleman, Jena; Addley H. Gladden, Jr., William G. Milholland, New Orleans; Eric L. Major, Oscar; Claude A. Martin, Welsh, and L. B. Faulk, Monroe.

To FORT MCPHERSON, Capt. J. T. Halsey, New Orleans.

To FORT OGLETHORPE for instruction, Lieut. J. McKowen, Baton Rouge.

To FORT SAM HOUSTON, Lieut. O. B. Kiel, New Orleans.

MARYLAND

To ANNAPOLIS JUNCTION, Lieuts. M. T. Burrows, Baltimore, and W. E. McClanahan, Highlandtown.

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Edward H. Benson, Charles E. Sima, Baltimore, and Amos F. Hutchins, Brooklyn.

To report to John D. Ryan, director general of military relief, Washington, for duty as his assistant, Major W. H. Smith, Baltimore.

To BALTIMORE, Lieut. J. F. Lutz, Baltimore.

To FORT BENJAMIN HARRISON for duty, Lieut. Pinkney L. Davis, Baltimore.

To FORT OGLETHORPE, Lieut. G. M. Boyer, Damascus.

To PHILADELPHIA, Capt. D. MacCalman, Baltimore.

To WASHINGTON, D. C., Lieut. E. S. DuBray, Baltimore.

So much of Par. 33, S. O. 157, July 9, 1917, War D., as relates to Capt. Clement A. Penrose, Baltimore, is revoked.

MASSACHUSETTS

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieut. Harry Olin, Boston, and Louis H. Limauro, Lynn.

To ATLANTA for duty, Lieut. Homer L. Conner, Haverhill.

To AYER, MASS., Capt. A. H. Crosbie, Boston, and Lieut. A. G. Bolduc, Attleboro.

To FORT BENJAMIN HARRISON for duty, Lieuts. John M. Birnie and Patrick M. Moriarty, Springfield.

To FORT GREBLE, R. I., Lieut. J. H. Kearney, Fitchburg.

To FORT SAM HOUSTON for duty, Lieuts. D. J. MacPherson, Boston, and G. L. Schadt, Springfield.

So much of Par. 51, S. O. 121, May 25, 1917, War D., as relates to Lieut. H. E. Carney, Boston, is revoked.

MICHIGAN

To BATTLE CREEK, MICH., Capt. T. B. Henry, Northvell; Lieuts. S. S. Danziger, H. B. Schmidt, Detroit.

To FORT BENJAMIN HARRISON, Lieut. G. C. Hafford, Albion.

MISSISSIPPI

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. William W. Allred, Kiln, and Fred L. Ricks, Starksville.

To CANAL ZONE for duty, Lieut. M. C. Henry, Bentonia.

To FORT OGLETHORPE, Lieuts. L. F. Barrier, Greenwood; H. T. Cuming, Gloster, and R. P. Hentz, Ittabena.

To report in person to commanding general, Southern Department, for duty, Capt. W. E. Richards, Columbus.

MISSOURI

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Capt. Arthur H. Sewing, St. Louis; Lieuts. Louis M. Edens, Cabool; Guy F Robinson, Koch, and Alvin H. Maeys, St. Louis.

To CHICAGO, Lieut. W. L. Moore, St. Louis.

To AYER, MASS., Lieut. F. L. Bishop, St. Louis.

To FORT OGLETHORPE for duty, Lieut. O. F. McKittrick, St. Louis.

To FORT RILEY, Major M. P. Ravenel, Columbia, and Capt. W. L. McBride, Kansas City.

To HAWAII for duty, Capts. R. K. Ogilvie, East Prairie; F. D. Dickson, Kansas City; R. S. Bryan, St. Louis, and Lieut. C. P. Mueller, Kansas City.

To WASHINGTON, D. C., Capt. V. P. Blair, St. Louis.

MONTANA

To FORT RILEY for instruction, Lieut. F. W. Loring, Whitehall.

NEBRASKA

To FORT DOUGLAS, Capt. J. A. Henske, Omaha; B. L. Shellborn, Peru.

To HAWAII for duty, Lieut. C. E. Pinckney, Gretna.

NEW JERSEY

To ALLENTOWN, PA., Lieut. H. Rogers, Orange.

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Normann S. Garrison, Rutherford, and David W. Green, Salem.

To FORT OGLETHORPE, Lieuts. Morris R. Faulkner, Vineland; to post hospital for duty, A. A. Strasser, Arlington, and W. L. Vroom, Ridgewood.

To FORT ONTARIO, N. Y., for duty, Capt. F. W. Cornwall, Plainfield.

To WRIGHTSTOWN, N. J., Lieuts. J. C. Bitler, Hammonton; E. K. Fee, Lawrenceville, and J. B. Griswold, Morristown.

NEW MEXICO

To FORT BLISS to examine troops on duty for tuberculosis, Capts. David C. Twichell, Albuquerque; Earl S. Bullock, Silver City, and Lieut. Ernest A. Duncan, Silver City.

To report by telegraph to the commanding general, Southern Department, for assignment to duty, Major H. A. Ingalls, Roswell.

NEW YORK

To ALLENTOWN, PA., Lieuts. Joseph S. Baldwin, Brooklyn; Harvey R. Gaylord, Buffalo; Darwin O. Lyon, Mount Vernon; Mark F. Healy, T. E. Lavelle, and C. E. S. Webster, New York.

To ANNAPOLIS JUNCTION, MD., Capt. E. E. Tull, New York.

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Capt. John A. Battin, Westport; Lieuts. Carl E. Dunaway, Henry J. Meister, New York; Alson J. Hull, Troy, and Page E. Thornhill, Watertown.

To ATLANTA for duty, Capt. Howard L. Van Winkle, Albany, and Lieut. Stephen H. Curtis, Troy.

To CANAL ZONE for duty, Lieut. I. Michkin, New York.

To CORNELL MEDICAL COLLEGE, New York, Capt. U. S. Kann, Binghamton; Lieuts. W. G. Herrman, Brooklyn; J. C. Howard, New York, and D. S. Childs, Syracuse.

To FORT BENJAMIN HARRISON, Major F. W. Loughran; Capt. A. S. Vosburg; Lieuts. Harry T. Morton and H. E. B. Pardee, New York, and F. H. Spencer, Waverly.

To FORT OGLETHORPE for instruction, Lieut. Charles N. B. Camac, New York.

To FORT ONTARIO, N. Y., for duty in connection with Unit N., Lieut. J. J. Cunningham, New York.

To FORT SNELLING, MINN., Capt. W. M. Richards, New York.

To GOVERNORS ISLAND, N. Y., Lieut. Arthur G. Quinn, Staten Island.

To MADISON BARRACKS, N. Y., for duty, Major Henry L. K. Shaw, Albany.

To NEW YORK, Capts. A. M. Kane, Brooklyn, and E. W. Caldwell, New York.

To ROCKEFELLER INSTITUTE, New York, Capt. Ethan F. Butler, Yonkers; Lieut. M. McBurney, and T. F. X. Sullivan, New York.

To WASHINGTON for duty, Capt. Sidney R. Burnap, New York.

To YAPHANK, LONG ISLAND, N. Y., Capt. A. I. Boyer, New York; Lieuts. R. E. Brodie, Albion, and B. B. Benson, New York.

To report in person to commanding general, Southern Department, for duty, Lieut. F. L. Horton, Brooklyn.

To home, Lieut. B. H. Eliasberg, New York.

NORTH CAROLINA

To BALTIMORE, Lieut. H. H. Ogburn, Greensboro.

To COLUMBIA, S. C., Lieut. G. S. Coleman, Kenly.

To FORT OGLETHORPE, Lieuts. L. N. West, Raleigh; to post hospital for duty, F. J. Pate, Greensboro.

To report to comanding general Southern Department, for duty, Lieuts. G. W. Pressly, Charlotte, and J. L. Moore, Wendell.

NORTH DAKOTA

To HAWAII for duty, Capt. A. J. McCannel, Minot, and Lieut. F. O. Brigham, Stanley.

OHIO

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Luman G. Moore, Kinsman; John F. Stober, Lexington; John J. South, Massillon, and Karl D. Figley, Toledo.

To CHILLICOTHE, OHIO, Lieuts. C. C. Crosby, R. B. Wynkoop, Ashtabula, and B. F. Cureton, Walhonding.

To FORT BENJAMIN HARRISON for duty, Major Colin R. Clark, Youngstown; Lieuts. Charles D. Treister, Robert W. Williams, Cleveland, and John C. Larkin, Hillsboro.

To FORT LEAVENSWORTH for duty, Lieut. H. R. Wahl, Cleveland.

To FORT OGLETHORPE post hospital for duty, Lieut. H. de G. Sherman, Cleveland.

To WALTER REED HOSPITAL, Takoma Park, D. C., Capt. David M. Roberts, New Richmond.

OKLAHOMA

To FORT RILEY for duty, Lieut. J. G. Janney, Lawton.

To FORT SAM HOUSTON, Lieut. H. C. Johnson, Antlers.

To report by telegraph to the commanding general, Southern Department, for assignment to duty, Lieut. H. S. Browne, Tulsa.

OREGON

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieut. John E. Kuydendall, Eugene.

PENNSYLVANIA

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieuts. Thomas L. Smyth, Allentown; William B. Evans, Chester; L. M. Sankey, Jeannette; Samuel LeR. Ridge, Longhorne; Isaac I. Parsons, Media; Chester A. Bardsley, James B. Clinton, Toby A. Greco, Samuel B. Greenway, John V. Kearney, Howard F. Keating, Baldwin L. Keyes, Thomas Klein, Richard J. Miller, George K. Tweddel, William F. Whelan, Philadelphia; A. R. Howard, Herbert M. Long, Charles H. Marcy, Harry L. Murphy, Ward I. Pierce, Frank C. Rote, Pittsburgh; Clyde E. Tibbens, Scranton; Albert Shannon, Titusville; Benjamin P. Doran, and Robert H. Jeffrey, Uniontown.

To FORT BENJAMIN HARRISON, Lieuts. Joseph Turner, W. S. Shimer, and E. E. Johnson, Philadelphia.

To FORT OGLETHORPE, Major A. C. Abbott, Philadelphia; Capt. M. J. Shields, Scranton; Lieuts. R. A. Keilty, Lansdowne; F. W. Knippel, Mercer, and William P. C. Clancy, Warren.

To FORT SAM HOUSTON for duty, Lieut. C. H. Bailey, Jamestown.

To NEW YORK, M. W. Meyers, Allentown.

To PHILADELPHIA, Lieut. J. E. Livingood, Womelsdorf; as instructor in military roentgenology, Major Willis F. Manges.

To ROCKEFELLER INSTITUTE, New York, for duty, Lieut. Alan C. Woods, Philadelphia.

To WASHINGTON, D. C., Lieut. M. S. Bowers, Braddock.

PHILIPPINE ISLANDS

To ALLENTOWN, PA., Capt. C. C. Hillman, Manila.

SOUTH CAROLINA

To CANAL ZONE for duty, Lieuts. T. J. Peake, Clinton, and E. E. Epting, Williamstown.

To FORT OGLETHORPE for instruction, Lieuts. Ralph H. McFadden, Chester, and George F. Klugh, Crosshill.

SOUTH DAKOTA

To FORT OGLETHORPE for instruction, Capt. David J. Carson, Faulkton.

To ST. LOUIS, Lieut. A. J. Black, Oldham.

TENNESSEE

To FORT BENJAMIN HARRISON for duty, Lieut. M. E. Bry, Memphis.

To FORT OGLETHORPE for instruction, Capt. William A. Carnes and Lieut. Marcus G. Spingarn, Memphis.

To FORT SAM HOUSTON, Lieut. C. McK. Beck.

To LITTLE ROCK, ARK., Lieuts. J. C. Eldridge, Chattanooga; R. R. Sellers, Erwin, and W. H. Baldwin, Memphis.

To WASHINGTON for duty, Lieut. Louis W. Desprez, Memphis.

To report in person to commanding general, Southern Department, for duty, Lieuts. W. M. Blackshore, Lucy, and S. S. Moody, Shelbyville.

TEXAS

To ALLENTOWN, PA., Capt. H. J. Hallett, San Antonio.

To ARMY MEDICAL SCHOOL, Washington, D. C., for instruction, Lieut. Giles W. Day, Fort Worth.

To FORT ADAMS, R. I., Major William H. Lloyd, El Paso.

To FORT BLISS to examine troops for tuberculosis, Lieut. Paul Gallagher, El Paso.

To FORT SAM HOUSTON, Capt. T. H. Harrell, Gonzales; Lieuts. R. M. Prather, Beeville, and J. W. Conley, Saron.

To report by telegraph to the commanding general, Southern Department, for assignment to duty, Capts. I. McNeil, El Paso; W. H. Hargis, San Antonio; Lieuts. D. M. Vogt, Fort Bliss; T. O. Wooley, Germantown; C. C. Cody, Jr., E. L. Goar, Houston; C. C. Cade, San Antonio, and G. P. Acton, Sherman.

UTAH

To FORT DOUGLAS, Lieut. J. J. Galligan, Salt Lake City.

VIRGINIA

To CORNELL MEDICAL COLLEGE, New York, Lieut. G. O. Crank, Madison Heights.

To FORT BENJAMIN HARRISON for instruction, Lieut. Henry C. Bradford, Norfolk.

To FORT OGLETHORPE, Lieuts. H. C. Mallory, Greenbackville, and Frank Levinson, Hopewell.

To FORT SAM HOUSTON, Lieut. B. L. Crawford, Richmond.

To PETERSBURG, VA., Capt. H. T. Nelson, Charlottesville; Lieuts. W. F. Merchant, Manassas, and H. R. Seelinger, Norfolk.

To RICHMOND, VA., Lieuts. F. M. Hodges, C. L. Rudosill, Richmond.

WASHINGTON

To AMERICAN LAKE, WASH., Lieuts. W. F. Cunningham, Seattle; M. R. Charlton and R. N. Hamblen, Spokane.

WEST VIRGINIA

To FORT OGLETHORPE, Capt. E. Davis, Salem, and Lieut. E. H. Bitner, Martinsburg.

WISCONSIN

To FORT BENJAMIN HARRISON, Lieuts. C. H. Andrew, Platteville, and Benjamin B. Rowley, Whitefish Bay.

To FORT LEAVENWORTH, KAN., Lieut. F. B. Taylor, Madison.

Orders to Officers of Medical Corps

Major Louis T. Hess, M. C., to Washington for examination for promotion.

Lieut.-Col. D. F. Duval, M. C., from Canal Zone to Fort Riley for duty.

Major H. H. Johnson, M. C., to Fort Washington for duty.

Capt. R. C. Bull, M. C., having been found physically disqualified for the duties of a major by reason of disability incident to the Service, his retirement with the rank of major is announced from May 15, 1917, the date on which he would have been promoted to that grade had he been found qualified.

Capt. N. T. Kirk, M. C., to Fort Oglethorpe for temporary duty.

Capt. E. R. Gentry, M. C., to Fort Leavenworth.

Capt. Edgar D. Craft, M. C., having been found physically disqualified for duties of major by reason of disability incident to service, his retirement with the rank of major is announced from May 15, 1917, the date on which he would have been promoted by reason of seniority had he been found qualified.

Major William A. Powell, M. C., now at training camp, Fort Benjamin Harrison, Ind., will report to C. O. of that camp for duty.

Major Clarence H. Connor, M. C., will report in person to Col. William H. Arthur, M. C., president of the examination board at Washington, D. C., for examination to determine his fitness for promotion.

Major Harold W. Jones, M. C., in addition to his other duties, is detailed as professor of medical department administration at the Army Medical School, Washington, vice Col. James D. Glennan, relieved.

Major Henry F. Pipes, M. C., is relieved from further station at Fort Slocum, N. Y., and is assigned to duty at Jefferson Barracks, Mo.

Lieut. Col. Jere B. Clayton, M. C., is relieved from his present duties and will proceed to Fort Sam Houston, Tex., and report in person to the commanding general, Southern Department, for assignment to duty as sanitary inspector of that department.

Lieut. Col. Henry A. Shaw, M. C., will repair to Washington, D. C., and report in person to the Surgeon-General of the Army for the purpose of making such special sanitary inspections as may be deemed necessary from time to time.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CONNECTICUT

Personal.—Dr. Marvin Z. Westervelt, Litchfield, has associated himself with the surgical department of the Winchester Arms Company, New Haven.——Dr. Ralph B. Cox, Collinsville, has been appointed health officer, succeeding Dr. George F. Lewis, who resigned after twenty-three years of service. ——Dr. Carrie North Stevens, West Cornwall, has been appointed health officer of Goshen.

New Bureau of Laboratories.—Dr. Charles J. Bartlett, New Haven, director of the pathologic laboratory, Yale University, has been appointed director of the bureau of laboratories of the state department of health, succeeding Prof. Herbert W. Conn, deceased.——P. E. Bransfield, Ira D. Joel, Ira V. Hiscock and George E. Stookey, who were assistants to Professor Conn, have been appointed to similar positions by the new director. It has been decided to remove the laboratory from Middlebury to the Agricultural Experiment Station, New Haven.

Free Orthopedic Dispensary.—The New Haven Orthopedic Dispensary has been established by the New Haven Normal School of Gymnastics. The institution is open daily and has ample equipment. The staff consists of Dr. Ernest H. Arnold, who has been in charge of the orthopedic clinic of the New Haven Dispensary for twenty-three years; Dr. James F. Rogers and Dr. Harry E. Stewart, Washington. The seniors of the New Haven Normal School of Gymnastics attend the daily clinics in sections, and carry out the manual and gymnastic treatment under the direction of the staff.

GEORGIA

Personal.—Dr. Thomas F. Abercrombie, Brunswick, has been elected secretary of the state board of health, succeeding Dr. Henry F. Harris, deceased. —— Dr. John C. McAfee, Macon, has been elected president of the Idle Hour Country Club.

New Buildings Near Completion.—On the campus of the Atlanta Medical College, now the medical department of Emory University, three fireproof buildings are being completed, and will be ready by the beginning of the session of 1917-1918. The cost, respectively, will be $90,000, $98,000 and $54,000.

Hospital Item.—Dr. Harlan L. Edwin and Dr. John C. Rollins have purchased the Herndon property in Dalton and will establish a hospital on the site.——At the meeting of the city council of Carrollton, it was decided to accept the offer of the late C. B. Simonson to donate $10,000 toward the erection of a sanatorium. For building and equipping the sanatorium about $30,000 will be required.

ILLINOIS

Chicago

New Lying-in Hospital.—The opening exercises of the Chicago Lying-in Hospital and Dispensary, located at Fifty-First Street and Vincennes Avenue, were held, July 28. The building is known as the Joseph Hobart Moore Memorial, is seven stories in height, and will accommodate 120 patients.

Army Tuberculosis Work.—Dr. George Thomas Palmer, Springfield, president of the state tuberculosis association and a member of the committee on tuberculosis of the National Council of Defense, has appointed Drs. Robert S. Berghoff, Clyde D. Pence and John H. McClellan to examine the officers at the Fort Sheridan Training Camp, with special reference to tuberculosis. Capt. James A. Britton, M. O. R. C., has been assigned by Dr. Palmer to similar work at Fort Benjamin Harrison, Indiana.

Recruiting for Hospital Units.—Recruiting for the new field hospitals, Nos. 3 and 4, and for ambulance companies, Nos. 1 to 4, under the direction of Major Gustavus M. Blech, commanding Field Hospital No. 1, has been completed, and the new hospitals and ambulance companies have been mustered into the state service. The commanders of these units are: Field Hospital No. 3, Major Frederick O. Frederickson; No. 4, Major James J. McKinley; Ambulance Company No. 1, Capt. George U. Lipshulch; No. 2, Capt. Henry C. Johannes; No. 3, Capt. J. Kubik, and No. 4, Lieut. C. S. Rogne.

Personal.—Dr. Hugh McGuigan, professor of pharmacology in Northwestern University, has accepted the position of professor and head of the department of pharmacology, materia medica and therapeutics in the College of Medicine of the University of Illinois.——A banquet was given at the Morrison Hotel recently in honor of Capt. George U. Lipshulch, commanding Illinois Ambulance Company No. 1.——Major Philip S. Chancellor, M. O. R. C., U. S. Army, has asked a reduction in rank to that of captain in order that he may participate in the work of a unit now being formed in California, for service in France.——Dr. Edward L. Moorehead has been appointed attending surgeon to the Mercy Hospital.

KENTUCKY

Sanatorium Fund Collected.—Up to noon, July 13, $40,000 of the $55,000 required for the Fayette County Tuberculosis Sanatorium, Lexington, had been subscribed.

Hospital Unit Organizes.—The Louisville City Hospital Red Cross Unit D, organized by Dr. Lewis S. McMurty, Louisville, has the following personnel: Director, Capt. Irwin Lindenberger, M. O. R. C., U. S. Army; chief of surgical division, Dr. Charles Farmer; chief of medical division, Dr. John B. Voor; surgical section, Drs. Isaac A. Arnold, Elbert W. Jackson, Lamar W. Neblett and Harry L. Pelle; medical section, Drs. Charles E. Gaupin, James H. Pritchett, Hiram S. Eggers and George H. Day.

MARYLAND

Personal.—Capt. Thomas R. Chambers and Lieut. Edward D. Ellis, Baltimore, have been appointed by Lieut.-Col. Henry Page, commanding the Medical Officers Training Camp at Fort Oglethorpe, Ga., members of the staff of the American Evacuation Hospital to be established in France.

Infantile Paralysis Again Appearing.—Several cases of infantile paralysis have appeared recently in Baltimore, and Health Commissioner John D. Blake is making an effort to prevent a repetition of the outbreak of last year. At Barton, Allegany County, several cases of infantile paralysis have appeared. There has been one death at Barton.

War Neuroses.—At the invitation of Dr. Adolf Meyer, Baltimore, the members of the Maryland Psychiatric Society attended a lecture on "War Neuroses" given by Dr. Thomas W. Salmon, New York, Medical Director of the National Committee for Mental Hygiene, July 26, at the Henry Phipps Psychiatric Clinic. The lecture was illustrated by pictures obtained by Dr. Salmon while abroad studying conditions at the front.

Tuberculosis Conference Planned.—The Maryland Tuberculosis Association announces a conference in Baltimore, October 18 and 19, of representatives of North Atlantic states. The general assembly at its session next winter will be asked to make large additions to the state's equipment for dealing with this disease. A local committee, of which Louis Hamman is chairman and H. Wirt Steele, secretary, is arranging the conference.

Meetings.—The first annual meeting of an association of medical societies of the Eastern Shore of Maryland, the Eastern Shore of Virginia, and Delaware was held at Ocean City, Maryland, July 26. The committee in charge of organizing the new association consisted of Drs. J. McFaddin Dick, Salisbury, chairman; Henry M. Lankford, Dawson O. George, W. H. Houston, A. A. Parker, W. N. Palmer, H. A. Cantwell, Princess Anne; Frank B. Hines, Chestertown; Herman F. McPherson, Centerville, and Eldridge E. Wolff, Cambridge, secretary.

MASSACHUSETTS

Personal.—Dr. Ralph R. Fitch, Dorchester, Boston, was made a Knight of the Legion of Honor for distinguished work in his hospital at St. Valery-on-Caux, by President Poincaré.——Dr. Henry L. Flynn has been appointed technical assistant in the bacteriologic department of the Boston Health Department.

Hospital Dedicated.—The Benjamin Stickney Cable Memorial Hospital, Ipswich, was formally dedicated, July 21. The building with its equipment is the gift of Mr. and Mrs. Richard T. Crane, Castle Hill. The hospital has at present arrangements for twenty-four beds, with an ultimate capacity of 150 beds, and has an endowment fund of $30,000.

Health Boards Hold Meeting.—At the regular quarterly meeting of the Massachusetts Association of Boards of Health, held at Pemberton Inn, Hull, Mass., July 26, Dr. Fred W. Johnson, secretary of the Civilian Health Committee of the Boston Chapter, American Red Cross, presented a paper on "The Red Cross and Health in Civilian Communities," and Dr. Charles E. Simpson, Lowell, city health officer, discussed "A Large Concentration Camp in Its Relation to a Civilian Community."

Directory of Food Facts.—An Information Bureau and Directory of Food Facts has been established at 69 Bedford Street, Boston, under the auspices of the War Service Committee of the Boston Women's City Club. The objects of the bureau are to collect and catalog literature on food conservation, to catalog agencies in the state for dealing with this problem, to act as a clearing house for other social forces in Boston capable of assisting in food conservation, and to publish a bulletin of information called *Food Facts.*

MONTANA

Hospital Incorporated.—Articles of incorporation of the Billings Deaconess Hospital were filed, July 13. The amount of capital stock is not recorded. It is stipulated that all accruing profits shall revert back to the maintenance fund, and that any balance remaining is to be devoted to charity uses in connection with hospital purposes.

Suggest Changes in Medical Examinations.—The jury of physicians that upheld the action of the state board of medical examiners in denying a license to Dr. Tracy T. Noland returned a supplemental report in the district court recommending the state board change its systems. At present only five questions are asked applicants, the physicians aver, and if a man fails in one he must make a perfect answer to the other four to pass. The jury recommends fifteen questions be submitted and that applicants be privileged to answer two-thirds. It also deprecates the practice of giving catch questions.

NEBRASKA

Hospital Item.—The cornerstone of the New Swedish Mission Hospital, Omaha, was laid, July 15.——The Lincoln Hospital has been incorporated with a capital stock of $10,000, and with the object of conducting a hospital for the treatment of obstetric, medical and surgical cases, and the training of nurses.

New Advisory Board.—The advisory board to the state board of health, provided for in the Fox bill passed by the last legislature, has been appointed by the governor, and includes Dr. Joseph J. Hompes, Lincoln; Dr. Joseph E. Spatz, Fairfield; Dr. William T. Johnson, Pawnee City, and Dr. Charles L. Mullins, Broken Bow.

Personal.—Dr. Edwin W. Cook, Plattsmouth, has been appointed supreme medical director of the Modern Woodmen of America, and has moved to Rock Island, Ill.——Dr. H. Winnett Orr, formerly superintendent of the State Orthopedic Hospital, Lincoln, has been assigned to duty in the Welch Metropolitan War Hospital near Cardiff, South Wales.

NEW YORK

Personal.—Dr. Paul E. Betowski has been appointed surgeon-in-chief of the Bath Soldiers' Home Hospital, succeeding Dr. Raymond C. Hill, who has been called into active service.——Dr. Otto Pfaff, Oneida, has been elected president, and Dr. Nelson O. Brooks, Oneida, treasurer of the Madison County War Emergency Committee on Tuberculosis.

New Laws Affecting Public Health.—The *Weekly Bulletin* of the department of health, July 14, gives a summary of recent legislation affecting public health work. Among these laws are the following: General Corporation Law, providing for the revocation of charter or authority to do business in this state of corporations which conduct their business in another state in such a manner as to create a nuisance in this state by discharge of dust, smoke, steam, gas or offensive odors or fumes. On complaint, the state commissioner of health is to determine whether a nuisance is being committed. This law provides a remedy for the abatement of the nuisance caused by the offensive fumes arising from the manufacturing plants located in New Jersey opposite Riverside Drive and opposite Staten Island.——Senate Bill No. 242, introduced by Mr. Gilchrist, requiring laboratories and places where live pathogenic germs are handled or cultivated to be licensed by the state department of health. The fee is $1. Each culture sent out by such laboratory must be labeled to show the laboratory license number, name of person obtaining it, and destination of the germs.——Senate Bill No. 488, adding a new section to the Education Law, providing for the education of children with retarded mental development. It requires local school authorities to ascertain the number and provide classes for such children.——Senate Bill No. 35, introduced by Mr. Whitney, requiring the superintendent of the state hospital at Ray Brook to give superintendents of county tuberculosis hospitals courses in the diagnosis and treatment of tuberculosis and in hospital administration, and regulating the receipt of free patients at the hospital.——Assembly Bill No. 1509, introduced by Mr. Grant, providing that standardized, evaporated or condensed milk must contain not less than 25.5 per cent. of milk solids, and not less than 7.8 per cent. of milk fats. Sweetened condensed milk must contain not less than 28 per cent. of milk solids and not less than 8 per cent. of milk fats.

New York City

Camp to Become Hospital.—The reserve camp at Sacket Harbor, known as Madison Barracks, is to be used as a hospital after the present reserve camp ends about August 15.

Floating Hospital Needs Funds.—The Floating Hospital of St. John's Guild, which sails every day with 1,000 sick babies and their mothers, makes an appeal for funds with which to continue its work. The wards of the Seaside Hospital also supported by St. John's Guild are overcrowded with sick babies.

Drafted Men to Be Treated Free.—The medical examiners of the men drafted in this city have arranged for men who want to enter the draft army but are barred by physical disabilities that may be removed by operation to be treated free at Bellevue Hospital. It is hoped that other hospitals will make similar offers.

Honor to Doctor Baruch.—At a meeting of the committee on departments of the New York city council, it was recommended that the Rivington Street Public Bath in the Borough of Manhattan be known hereafter as the Dr. Simon Baruch Public Bath, in honor of Dr. Simon Baruch, the first person to make a plea for the institution of such baths in the United States.

The Blackwell Island Fire.—The committee on finance of the city council of New York has recommended the issuance of special revenue bonds, amounting to $7,000, for the purpose of reimbursing clergymen, physicians and others, serving in an official capacity, connected with the department, who suffered losses by fire at the workhouse on Blackwell's Island, March 17.

Columbia University Admits Women Medical Students.—A gift of $50,000 from George W. Brackenridge of San Antonio, Texas, will enable Columbia University to open its doors to women students this fall. An addition to the present building will be begun at once, in order to provide laboratory facilities in the departments of chemistry, pharmacology, pathology and bacteriology.

Surgeons as Police Aids.—Three hundred surgeons of New York have been enrolled in the Police Surgeon Auxiliary Medical Corps, which also includes the surgeons of the police and fire departments. The corps has been organized through the Women's Auxiliary of the New York Hospital. Dr. Edward T. Higgins, as chief police surgeon, is commanding officer. Each borough forms its own unit and is in charge of a borough chief. The borough chiefs include Dr. Harold Barclay, Dr. Alban E. Munson, Dr. Walter D. Sherwood, Dr. William T. Scovil, Richard Hill, and Dr. Alfred H. Thomas, New Brighton.

Personal.—Dr. George David Stewart was operated on for goiter in St. Mary's Hospital, Rochester, Minn., July 20.——Dr. Victor W. Anderson was seriously injured, July 19, when an automobile in which he was riding collided with a street-car.——Capt. Le Compte du Nouy and Major Lowey, who have been working with Dr. Alexis Carrel, have arrived in this country to demonstrate the new methods of treating trench wounds.——Dr. Michael J. Thornton, assistant superintendent of Bellevue Hospital, has been appointed captain and assistant surgeon in the Medical Corps of the United States Army.

Adequate Dispensary Treatment for Venereal Diseases.—At the last meeting of the board of health the following new section was added to the sanitary code to take effect immediately: Section 223. *Dispensaries—Communicable Disease;*

Regulations. "No public dispensary where communicable diseases are treated or diagnosed shall be conducted or maintained otherwise than in accordance with the regulations of the board of health." Under this section the department expects to compel dispensaries either to give up their departments for venereal disease or else to meet the standards set by the department of health, standards demanded by our present knowledge of these diseases and by the important relation of venereal disease to public health.

Labor Sanitation Conference.—The workers in this city have organized a movement for industrial sanitation, with headquarters at 32 Union Square. The chairman is Alfred J. Boulton, and the medical adviser, Dr. Louis I. Harris. The purposes of this organization are: 1. To find ways and means for labor to justly express its sanitary needs, and to establish direct communication with the official sanitary agencies of the nation, state and city. 2. To have representatives from all ranks of all laboring groups in the city act as a vigilance committee to guard sanitary standards. 3. To confer and agree on proper standards in their respective trades. 4. To form trade group committees to further the sanitary interests of workers in their respective fields. 5. To insure labor the opportunity to be consulted about educational work and to give it a part in disseminating such education. 6. To create public opinion for the enactment of such additional laws as may be required to safeguard the health of workers.

Health Department Issues Annual Report.—The annual report of the New York health department for the year 1916 shows that despite the epidemic of poliomyelitis last summer the death rate was the lowest the city has ever recorded, namely, 13.89 deaths per thousand population. The per capita cost of the department's activities have also been lower than for many years past, namely, 59.1 cents, whereas the average in recent years has been 65 cents. Among the most notable achievements to which the report calls attention was the reduction of the infant mortality rate. In 1910, out of every thousand infants born, 125 died during the first year of life; in 1915 the rate was ninety-eight. In 1916 it was ninety-three. The number of deaths from typhoid fever during the year was 1,617, as compared with 2,456 for the year preceding, a decrease of 839. In 1916, only 3,205 persons were bitten by dogs as compared with 3,648 in 1915. Only twenty-three rabid dogs were encountered in this city in 1916 as compared with 113 in 1915. The birth records show an actual decrease of 3,592 over the number for the preceding year. The reasons for this are ascribed to the decrease in foreign immigration and the low marriage rate experienced during the previous year, this being probably due to financial depression, nonemployment, etc. The year 1916 witnessed an increase in the number of deaths from violence, 4,235 deaths from this cause occurring in 1916 as compared with 3,819 deaths in 1915. In commenting on these the report states that the majority of these deaths were avoidable.

NORTH CAROLINA

War Study.—The Buncombe County Medical Society, Asheville, N. C., is holding regular weekly meetings for the purpose of special study of subjects pertaining to the war.

Personal.—Dr. James S. Mitchener has been appointed whole time health officer for Lenoir County, under the three-year cooperative plans arranged between the North Carolina State Board of Health and the counties for certain specific purposes. Ten North Carolina counties have volunteered for this work. To date Wilson, Nash, Northampton, Davidson and Lenoir counties have been accepted. The city of Kingston will have a joint board of health with the county under direction of Dr. Mitchener.——Dr. Thomas J. Summey, Brevard, prior to leaving for Ft. Oglethorpe, Ga., was tendered a banquet by citizens of Transylvania County at which he was presented with a watch.——Gov. Thomas W. Bickett has designated Dr. Charles O'H. Laughinghouse, Greenville, and Dr. John W. Long, Greensboro, medical members of the district exemption boards.

NORTH DAKOTA

Amalgamate for Sanitary Work.—The state board of health, the state public health laboratories and the state antituberculosis association have amalgamated under the name of the North Dakota Public Health Service. The organization has already begun a sanitary survey of Park River.

Personal.—Dr. Henry E. Dahleen has been appointed local surgeon for the Minneapolis, St. Paul and Saulte St. Marie at Hankinson.——Dr. Henry H. Healy has presented a flag and flag-pole to the St. Michael's Hospital, Grand Forks.——Major Frank E. Wheelon, Minot, has been commissioned major, M. C., N. D. N. G., and assigned to duty with the Second Infantry.

PENNSYLVANIA

York County Makes a Creditable Record.—York County Medical Society reports that 41 out of its membership of 121 have taken the examination for the Medical Reserve Corps.

Hospital Dedicated.—The new main building of the Grand View Hospital at Sellersville was dedicated with fitting ceremonies, July 22. Dr. Wilmer Krusen delivered the dedicatory address.

Personal.—Dr. John B. Lowman, Johnstown, councilor for the fifth district, goes to France as a member of the Jefferson Medical College Unit.——Dr. Joseph P. Ritenour, Uniontown, has been appointed college physician to the Pennsylvania State College.——Dr. George R. Moffitt, city bacteriologist of Harrisburg and a member of the Medical Reserve Corps, has been ordered to the Rockefeller Institute in New York for advanced work preparatory to entering active service.——Dr. Warren H. Butz, Allentown, has been appointed resident physician of the Taylor shipbuilding camp at Cornwells.

Philadelphia

Hospital Property Sold.—The property of the Providence General Hospital, consisting of the hospital building and 6 acres of ground on Lincoln Drive, Fairmount Park, has been acquired by the city for park extension. The price paid for the institution was $80,000.

Personal.—Dr. Thomas McCrae, professor of internal medicine in Jefferson Medical College, has been made chief medical officer of the Ontario Military Hospital, Orpington, Kent, England. This institution is said to provide 2,040 beds.——Dr. Richard Penn Smith, Ft. Louden, has been made a member of the Red Cross Mission to be sent to Roumania.

Medical Institutions.—The officers of the Central Pennsylvania Roentgen Ray Society for the ensuing year are: Dr. Harry M. Stewart, Johnstown, president; Dr. Forrest L. Schumacher, Dubois, vice president; Dr. William E. Reiley, Clearfield, secretary-treasurer; Drs. Russell H. Boggs, Pittsburgh; Francis C. Smathers, Punxsutawney, and Horatio W. Gass, Sunbury, censors, and Dr. Gerald D. Bliss, Altoona, reporter and editor. The next meeting will be held in Altoona in October.

Reception to Jefferson Unit.—The Ladies' Auxiliary of the Jefferson Medical College entertained the sixty-five nurses in the college library, July 26. These nurses are to constitute the nursing staff of Jefferson Base Hospital No. 38. Addresses were made by Mr. William Potter, president of the Board of trustees; Alba B. Johnson, a member of the board of trustees, and Dr. William M. L. Coplin, director of the unit. Each of the nurses was presented with a special Jefferson Medical College Hospital pin.——A three days' campaign by the Logan Improvement League, Fourth of July Committee and the Logan Branch of the Emergency Aid resulted in the collection of $2,500. This sum is to be used to purchase an ambulance for Jefferson Base Hospital No. 38.

SOUTH DAKOTA

Personal.—Lieut. Harry T. Kenney, M. C., S. D. N. G., Highmore, has been transferred from the Fourth Infantry and promoted to major, being assigned to duty with the First Cavalry.——Dr. Isaac W. Leighton, Scotland, has been commissioned captain, S. D. N. G., and assigned to duty with the Fourth Infantry.——Dr. Park B. Jenkins, Waubay, has been appointed physician to the state nurses' examining board.

VERMONT

Addison County Physicians Elect.—At the annual meeting of the Addison County Medical Society, in Middlebury, the following officers were elected: president, Dr. Charles H. Dean, Middlebury; vice president, Dr. Peter L. Dorey, Middlebury, and secretary-treasurer, Dr. Edward H. Martin, Middlebury.

Accepts Certificates of National Board.—At its recent business meeting, the Vermont Board of Medical Registration voted to accept certificates granted after examination by the National Board of Medical Examiners. This is the twelfth state in which either by special legislation or by board rulings certificates of the national board have been recognized.

Infantile Paralysis.—The state board of health, after a conference with the governor, has issued an order forbidding the holding of state and county fairs, chautauquas, street carnivals or circuses until further notice. The cause for this interdiction is the prevalence of infantile paralysis, sixty-eight cases having been reported, the majority of which were in Washington County.

WISCONSIN

Smallpox.—Smallpox has developed in Company I, First Wisconsin Infantry, in camp at Beloit.

Tuberculosis Camp Established.—A summer camp for children suffering from tuberculosis has been established near Neenah, Wis., by the common council of that city.

Hospital Items.—Drs. Robert B. Clark and Wilson G. Bear announce that they are about to open a hospital in Monroe. ——Excavation work was commenced on the St. Mary's Hospital, Ladysmith, July 1. The building will be three stories in height, with a basement, and will cost about $30,000.—— The Dominican Sisters have been presented with 5 acres of land on the lake shore, near Kenosha, and will erect a hospital on this site.——The Lakeside Methodist Hospital Company has been incorporated to establish, conduct, maintain and operate a hospital and a training school for nurses at Oshkosh. The incorporators are Dr. Wilbur N. Linn, C. C. Konrad and Dr. John G. Morris.

Personal.—Capt. Edgar C. Barnes, Ripon, has been commissioned major, M. C., Wis. N. G., and assigned to duty with the Fourth Infantry. —— Dr. George Martin, Baldwin, announces his retirement after twenty-three years' practice. ——Dr. Miles D. Cottingham, Lake Geneva, has been commissioned first lieutenant, M. C., Wis. N. G.——Drs. Oscar Lotz, Milwaukee; Frederick C. Haney, Watertown; Fay T. Clark, Waupun, and Edward Murphy, Eau Claire, have been appointed members of the state board of medical examiners. ——Dr. T. J. McCrory, Racine, has been appointed physician to the state athletic commission.——Col. Gilbert E. Seaman, chief surgeon, Wis. N. G., has resigned from the Board of Education of Milwaukee.

CANADA

Dominion Medical Council.—At the fifth annual session of the Dominion Medical Council, held recently in Ottawa, the registrar's report was submitted. It showed that thirty-six practitioners in Canada, over ten years in practice, had registered as members since the last annual meeting, and that thirty-five candidates had successfully passed in the two examinations, spring and fall. The next examinations will be held in Montreal and Halifax on the second Tuesday in October; in Toronto and Winnipeg, on the third Tuesday in June, 1918. The following officers were elected: president, Dr. Emmanuel P. Lachapelle, Montreal; vice president, Dr. R. Eden Walker, New Westminster, B. C., and registrar, Dr. Robert H. W. Powell, Ottawa (reelected).

Personal.—Surg.-Gen. John T. Fotheringham, C. A. M. C., Toronto, has returned after two years' service in France, and recently made a tour of the Northwest, in the interests of the recruiting propaganda.——Dr. Donald MacGillivray, Toronto, is home on furlough from the University of Toronto Base Hospital at Saloniki, where he has been nearly two years.—— Lieut.-Col. D. King Smith of the University of Toronto Base Hospital, who came back from Saloniki last fall, returned to England for active hospital work. Malaria which he contracted in Greece, however, had seized too strongly on his system, and he has again returned to Toronto.——Dr. Edwin G. Hodgson, Toronto, has joined the C. A. M. C., and has left for England.——Dr. Ansel M. J. Tanney, Montreal, has been appointed superintendent of the General Hospital, Quebec City.——The Military Cross has been awarded to Capts. Frank L. McKinnon, Winnipeg, and Frank M. Walker, Stony Creek.——Major Thomas D. Archibald, Toronto, who has been overseas a year, has been appointed chief medical officer of the Military Hospital, Whitby, Ontario.——Lieut.-Col. H. Ernest Kendall, Halifax, Sydney, N. S., is now in command of the St. Francis Xavier Hospital at Bramshott, England.——Dr. J. H. Carson, Vancouver, B. C., has been appointed medical superintendent of the Langara Convalescent Hospital, British Columbia.

GENERAL

Tuberculosis Conference.—The Southwestern Tuberculosis Conference will meet at Hotel El Tovar, Grand Canyon, Ariz., October 21 to 23.

Orthopedists Elect Officers.—At the annual meeting of the American Orthopedic Association, the following officers were elected: president, Dr. Herbert P. H. Galloway, Winnipeg, Manit.; vice president, Dr. Walter G. Stern, Cleveland; secretary, Dr. John Ridlon, Chicago, and treasurer, Dr. Gwilym G. Davis, Philadelphia.

Not Yellow Fever.—Surg.-Gen. Rupert Blue, U. S. P. H. S., advises that the news notice in THE JOURNAL of July 14, regarding a patient with yellow fever, said to be held at the Reedy Island quarantine, was based on erroneous information, as the postmortem findings were sufficient to exclude a diagnosis of yellow fever.

Obstetricians and Gynecologists to Meet.—The American Association of Obstetricians and Gynecologists will hold its thirtieth annual meeting at the Robert Treat Hotel, Newark, N. J., September 17-19, under the presidency of Dr. John William Keefe, Providence, R. I. Dr. Edward J. Ill, Newark, is chairman of the committee of arrangements.

Control of Cancer.—The National Council of the American Society for the Control of Cancer, at its June meeting, adopted a resolution commending the "action of the U. S. Bureau of the Census in publishing its notable report on the mortality from cancer in the U. S. Registration Area in 1914, and recording its appreciation of the courteous cooperation of the Director of the Census and all the members of his staff who contributed to the contribution of this unique volume, which represents an unparalleled contribution to the statistical study of malignant disease, and has already furnished the basis for many promising special investigations."

Bequests and Donations.—The following bequests and donations have recently been announced:

Fayette County Memorial Hospital, Indianapolis, $10,000, by the will of Edward Anstedd.

Presbyterian Hospital, Chicago, and Massachusetts General Hospital, Boston, each $10,000; Perkins' Institute for the Blind and Massachusetts Institute for the Blind, Boston, and Pasadena, Calif., Hospital, each $5,000, by the will of Mary Rose Harris, Chicago.

Goodhue County (Minn.) Tuberculosis Sanatorium, $1,000, by the will of Mrs. Minnie M. Barlow, Canyon Falls.

Lakeview Hospital, Chicago, and Home Hospital, Lafayette, Ind., each one-half of the estate, valued at $175,000, of Mrs. Nicholas W. Box, on the death of the husband of the deceased.

FOREIGN

State Department of Public Health in Austria.—The *Policlinico* of Rome states that the new emperor of Austria has organized a new state department, the chief of which is to be known as the minister of hygiene and social welfare.

Japanese Medical Officers on Way to Roumania.—One hundred Japanese physicians are said to be on the way to Roumania in charge of Dr. Motegi, chief of the Saiseikai Hospital and head of the surgical department of the Keio University.

Cost of Medical Service in Leeds.—Records of the medical service in the schools of Leeds show that in the year 1915-1916 the cost was $18,444. Nine physicians and six nurses were employed, and 18,069 children were examined, the treatment including both medical and dental attention.

Hookworm in Brazil.—Through the efforts of Dr. Charles Seidl, director of the public health department, and Drs. Lewis Wendell Hackett and George Stone of the Rockefeller Foundation, the Brazilian government has given the institution a free hand to wage a campaign against hookworm in the interior of Brazil.

Medals for Repatriated Physicians and Nurses.—It is announced in France that the *médaille d'honneur des épidémies* is to be conferred on a number of recently repatriated nurses and physicians who have been in prison camps in Germany and Austria. This is in honor of their conspicuous devotion during epidemics in the prison camps.

Italian Physician Condemned for Aiding Malingerer.—A courtmartial at Ancona has just condemned to a year in a military prison a private in the artillery on account of a factitious infectious process which had temporarily disabled him. The inoculation had been done for him by a surgeon, U. P. Vincenzo of Bari, who was sent to prison for six months.

Change in Staff of "Riforma Medica."—According to the wishes of the late Professor Rummo, the founder and director of the *Riforma Medica* of Naples, the weekly passes into the hands of Prof. A. Cardarelli, chief of the second medical clinic of the University of Naples, and Prof. E. Maragliano,

professor of clinical medicine at the University of Genoa and pioneer in various branches of medicine, especially in tuberculosis. A. Ferrannini is to be the editor in chief. He is professor of clinical medicine at the University of Camerino. The *Riforma* is now in the thirty-third year of its dignified existence. Its large pages, large type and broad spacing have always set it apart from its more strenuous fellow journals.

LONDON LETTER

LONDON, July 11, 1917.

War Bread

War bread—the only bread now permitted—is made from wheat and flour milled to 81 per cent. to which a minimum of 20 per cent. of maize products, barley, oatmeal, rye, rice and beans must be added. This bread is more nutritious than the white bread, made from wheat milled to a lower percentage, which was practically universally used before the war. It is no hardship whatever to eat war bread, but a certain number of people find it less palatable, and complaints have been made that it is less digestible and produces skin eruptions, and that it quickly becomes stale and uneatable. Many of these complaints are unfounded, but some bakers have not been very successful in dealing with the new flour and have produced an unpalatable loaf. Moreover, a "disease" of bread, the "rope" disease, has made its appearance sporadically throughout the country. When a piece of ropy bread is broken it is found to be gummy inside, and when pulled apart this sticky substance is drawn out into numerous glistening strands. The whole bread problem is being investigated by experts appointed by the government. The rope disease has been found to be due to a germ — the *Bacillus mesentericus*—which is generally present in any dirt or dust and is usually found on the outer husk of wheat. The germ is almost always present in flour, but milling to a higher percentage of extraction and the use of wheats of lower grades, such as are now coming to this country, tends to increase the risk. The bacillus is normally quite harmless; but when the conditions are favorable it causes fermentation, and the bread becomes "ropy." In the earlier stages of the disease the bread is unwholesome, and in the later uneatable. There does not seem to be any evidence that admixtures increase the risk of "rope." The conditions leading to the fermentation are warmth and excessive moisture, and the wide distribution of the trouble recently is probably partly due to the exceptional weather conditions. Generally speaking, bakers have done their best under difficult circumstances, and with increased experience it is believed that they may succeed in producing a still more nutritious and palatable bread. It has been found impossible for bakers to maintain an exact weight of the loaf, and the absence of any latitude in weight has had a tendency to underbaking. This seems to be a disposing cause of "rope." After baking, the desire to avoid loss in weight leads the baker to cover the loaves with damp cloth, producing the exact conditions most favorable to the growth of germs. The combination of undercooked dough with a moist warm temperature appears exactly suitable for the growth of "rope." Mr. W. B. Hardy, F.R.S., secretary of the Royal Society, one of the experts appointed by the government, states that the *Bacillus mesentericus* is exceedingly tolerant of heat and therefore is not killed in baking. He makes the almost incredible statement that five hours' boiling is necessary for its destruction.

Baby Week

The great loss of life in the war has caused increased attention to the saving of infant life. A national baby week campaign has taken place in order to awaken the public conscience and promote measures which make for the welfare of mothers and children. The queen opened a child's welfare and mothercraft exhibition, and a public meeting of health and social workers was held in the Guildhall and addressed by three ministers of state. All the machinery of propaganda has been set in motion, and no effort has been spared to bring home to parents, municipal authorities, societies, schoolchildren and the general body of citizens, by meetings, lectures, leaflets, exhibitions, competitions, cinematograph films and in a score of other ways, the vital importance of mobilizing for the prevention of infantile mortality and the preservation of the health of mother and babies. Baby shows and "pram parades" are among the more picturesque features of the plan for popularizing the cult of the child. Lord Rhondda, lately president of the Local Government Board, stated at the Guildhall meeting that through carelessness, want of knowledge, and lack of the necessities of life, 2,000 infant lives are lost every week under the age of 1 year, and 3,000 a week under the age of 5. According to medical authority, at least 1,000 of those 3,000 lives could be saved. This saving it is hoped to effect by the campaign. A greater effect would be that the bulk of the babies who lived would be stronger, and when they grew up, more efficient citizens. What are wanted are cleaner and healthier homes, proper food and care for expectant and nursing mothers, more maternity centers, more health visitors, more skilled attention for mothers and children, and pure milk for the children.

Anthrax from Shaving Brushes

Some time ago I reported cases of anthrax due to a cause not previously recognized—infected shaving brushes. A government inquiry has been conducted into the subject by Dr. F. H. J. Coutts. He found that the hair used in making these brushes consisted in great part of Chinese horsehair, which had not been disinfected. The remaining unmanufactured hair from the same source was found to be largely infected. The manufacturer explained that the hair was invoiced to him as "goats' hair," which does not come under the Home Office regulations, and that for this reason he had not subjected it to disinfection. Four other cases of anthrax were traced to brushes made in New York, and a consignment of shaving brushes from Japan was found to be heavily infected with anthrax. The Local Government Board has under consideration what administrative action is required to make sure that hair used in the manufacture of shaving brushes in this country is satisfactorily sterilized before the brushes are manufactured. It will be necessary also to see that imported brushes are similarly free from infection. For this purpose, a guarantee of origin may be desirable, as well as examination of samples of brushes after importation.

The British Medical Association and the Insurance Act

In spite of the war, the discussion of the working of the insurance act continues. The British Medical Association has issued a report based on the views of all its local branches and divisions which were asked to appoint representative subcommittees to consider the present system so far as it affects the relation of the medical profession to the public health and the treatment of disease, and to make suggestions for its improvement. The general system in the main is approved. It is agreed that there must be an extension of the number of salaried medical officers in connection with preventive medicine and of purely administrative officers, on both the preventive and clinical sides, but that the treatment of individual patients, in their interest as well as in that of the profession, shall not be through salaried officers but by physicians paid by some method dependent either on the actual items of work done or on the number of persons for whom they accept responsibility. It is held that healthy competition as far as possible on the lines of private practice keeps physicians up to a good level of efficiency and encourages initiative and individuality. The wide possibility of the choice of physician by the patient tends to promote that influence of personality and that mutual confidence so important in treatment. If it is said that the patient is often unable to exercise a wise choice, it can be replied that he is more likely to know the physician who most appeals to him than any other person or body can. The systematic partitioning off of particular classes of disease from the general practitioner's usual work is held to be uneconomical, unscientific, detrimental to the interests of the patient, and productive of deterioration in the general standard of professional ability. Whole-time appointments in a state service would of necessity be made by bodies in which the lay element was paramount, and advancement by influence or for political or other improper reasons would be not unlikely. All are agreed that the present system is imperfect and should be modified so as to attract as many physicians as possible. Benefits should be extended so as to include a consultant and specialist service and institution treatment.

The War

THE VALUE OF WILD FOODS

As stated in a previous letter, attention is being directed to the value of wild foods which are almost entirely neglected. The inhabitants of rural districts are being shown what extensive supplies of natural food lie at their doors and around their dwellings, and are being taught so to utilize them that the ordinary products of the farm, garden or allotment may be made available, at a remunerative price to the

grower, for the sustenance of the population of the larger towns and cities. Following the recent publication of a practical guide to "The Wild Foods of Great Britain," which indicates over 260 different articles of diet only awaiting collection of those who have learned to distinguish them, and provides recipes for their treatment in order to render them palatable and nutritious, it has been decided to send to the villages and smaller towns lecturers and demonstrators, equipped with traveling kitchens or using the school kitchens and appliances already possessed by the various education committees. They will point out to the people the wild foods immediately available in their own localities, and show them how to prepare them for home consumption. The amount of available wild food that has been wasted in England in past years is incalculable. In continental countries, and to a lesser extent in Scotland, these natural sources of supply have never been neglected; while in most parts of the kingdom some one or other wild product of the countryside has always been used by its inhabitants. The instructors to be sent out by the county councils will find that in one place snails, in another the edible frog, in others hedgehogs, in some nettles, or whortleberries, or avrons, or the edible fungus called blewits, and on the coast dulse and laver and samphire, are already commonly eaten. Basing their instruction on the fact that some one or other of the natural foods of the country are already eaten by the inhabitants of the locality they are visiting, it will not be difficult for them to demonstrate that there are others of the seventy-odd food-producing plants, edible fungi, and freshwater fish equally worth gathering and eating. The plan to be adopted is for the lecturers and demonstrators in wild food collection and cookery to visit the smaller centers either with a caravan fitted as a traveling kitchen or with one of the traveling kitchens already possessed by different county councils, and after they have examined the natural resources of the locality and determined its available food supply at the moment, to deliver a brief lecture in the schoolroom, parish hall, or on the village green, and to call for volunteers from the inhabitants—schoolchildren, teachers and others—to form a collection of them on the following morning. This collection will be brought to the traveling kitchen or to that of the schoolhouse, and the demonstrator will then give practical instruction to the villagers in the different methods of preparing them for food.

PARIS LETTER

PARIS, July 12, 1917.

Personal

Dr. Henri Roger, professor of experimental and comparative pathology at the Faculté de médecine de Paris, has just been chosen dean of the institution in place of Professor Landouzy, deceased. Dr. Georges-Eugène-Henri Roger was born at Paris in 1860. He became hospital intern in 1883 and doctor of medicine in 1887, his thesis being "The Action of the Liver on Poisons." In 1892 he was appointed surgeon of the Hôpitaux de Paris and agrégé at the Faculté de médecine, and in 1905 he was given the chair of experimental pathology. He was a pupil of Bouchard, and made a special study of infectious diseases, their origin, their evolution, the resistance of the organism to their invasion, and the therapeutic treatment recommended in divers cases. Autointoxication and malignant tumors have likewise been favorite subjects of research. Roger presided over the first Congrès de pathologie comparée, and was an active collaborator of the "Dictionnaire encyclopédique des sciences médicales" and the "Traité de pathologie générale" by Bouchard. He is also author of an "Introduction à l'étude de la médecine," which deserves to become a classic. Professor Roger has been a member of the Académie de médecine since 1910.

Dr. Widal, professor of internal pathology at the Faculté de médecine de Paris, has been appointed, at his own request, professor of the medical clinic of the same institute, in place of Professor Landouzy.

Death of Dr. Albert Mathieu

Dr. Albert Mathieu, physician of the Hôpitaux de Paris, died recently, aged 59. He had specialized in diseases of the stomach. He was the author of numerous works on this general subject, as well as many special studies on alimentary regimens for dyspeptics, the hygiene of obesity and gout, etc. Dr. Mathieu was the organizer of the first three Congrès d'hygiène scolaire which brought to Paris educators and medical men from all parts of the world.

The War

SOLDIERS CONVALESCING FROM MALARIA

At the last meeting of the Académie de médecine, Dr. Jeanselme, agrégé professor at the Faculté de médecine de Paris, and physician of the Hôpitaux de Paris, called attention to the desirability of excluding from the hospitals such soldiers as have been suffering from malaria, but whose condition is improved, though not sufficiently to allow them to return to their regiments. The preferable disposition of such semi-invalids seems to be to send them to the abandoned farms, which there has been an organized effort to reclaim. These soldiers would be divided up into groups, and would work under superintendents. A physician would inspect them from time to time, and would report on the effect of the work, which it would be the endeavor to adapt to their weakened strength. It would be necessary, moreover, to ascertain in advance whether or not the country to which they were to be sent is infested with mosquitoes of the genus *Anopheles*, which are carriers of malaria.

THE REEDUCATION OF WAR CRIPPLES

The senate has just finished the examination of the proposed bill looking to the obligation of vocational reeducation of the war wounded and the war cripples who are beneficiaries of the law regarding military pensions.

The first paragraph of Article I reads thus: All soldiers, or former soldiers, of the army or navy suffering from infirmities resulting from wounds received or diseases contracted or aggravated during the present war may demand enrolment at a school for vocational reeducation, with a view to their readaptation to work, especially to their vocational reeducation and their future employment.

The proposed bill as a whole having been passed by the senate, this body declared that it is a matter of urgent necessity to carry on vigorously the vocational reeducation of the war wounded and the war cripples during the discussion of the bill before the Chamber of Deputies, and expressed the hope that the government will develop and stimulate the action of the organizations created by the state, the several departments and the communes, and will encourage the work begun through private initiative, which has sprung up since the very beginning of the war throughout the whole country, having for its purpose the giving to the victims of the war the place to which they are entitled in the economic life of the nation.

PREPARATION OF INVALID LIST

Justin Godart, undersecretary of state for the military medical service, has just addressed a communication to the chairmen of the different district boards, the purpose of which is to avoid any delay that might arise in the preparation of the invalid list. This communication emphasizes especially that the chief surgeons should prepare promptly the lists required by the medical and administrative service; said lists to contain names of the wounded and the sick that may be eligible to pensions or allowances. In case boards do not respond within ten days to the demands as set forth in this communication, an appeal may be taken to the general in command of the district whose officials are dilatory. The chairmen of the boards and the consulting medical officers must see to it that the names of the wounded and the unfit, who are entitled to be placed on the invalid list or the pension list, are sent to the special commissioners as soon as possible. They will be held personally responsible for any delays or any evidence of neglect of duty.

THE ARMY MEDICAL CORPS AND THE WAR

At the instance of the Union des Syndicats médicaux de France, a delegation of representative medical officers has been sent to Justin Godart, undersecretary of state for the military medical service, to present to him the recommendations of the Army Medical Corps, which were as follows: 1. The appointment of medical officers, with the rank of "sous-aide-major." 2. The promotion of capable medical officers, together with the accordance of special distinctions. 3. The retirement of medical officers who, on account of age or ill health, are unfit for service. 4. The application of the decree of Oct. 17, 1916, relative to the new status of the Army Medical Corps. This decree should be modified in such a way that the alphabetical arrangement of the names of medical officers going to the front shall be superseded by an arrangement which would permit of consideration of the time spent at the front and the wounds received. Publication of this list is demanded. 5. The desirability of consulting the medical associations of each department in regard to the organization of the civil clientage in the sections of the country that are

bereft of physicians. 6. The status of the students of the P. C. N. and of foreign students and medical men.

ANTITETANIC SEROTHERAPY

In connection with the recent discussions held at the Société de chirurgie de Paris on the value of antitetanic serotherapy, Dr. Chavasse communicated to the society an important statistical study on the cases of tetanus (213) encountered in the army during the period of fifteen months, extending from Nov. 1, 1915, to Feb. 1, 1917. The general conclusions that may be drawn from this study are:

1. The preventive injections of antitetanic serum employed in cases of gunshot wounds, even though they may not have always prevented the development of tetanus, have shown their efficacy in an incontestable manner in bringing about a very perceptible diminution of the number of cases of this dreaded complication in the hospital units of the army.

2. The gravity of tetanus has been shown in a general way in relation to the gravity of the local lesions. It has been found to be especially excessive in the complications of frost-bites. Tetanus appears to become less grave in war wounds in proportion to the number of preventive injections given, even though one may be dealing with the most serious and complicated cases.

3. The preventive doses employed have not always been proportioned in accordance with the gravity of the wounds. However, it was recommended to the army in June, 1916, on the advice of Roux and Vaillard, that the standard dose of 10 c.c. should be doubled or even tripled, at least for the first injection, in the case of wounds with extensive lacerations, and infected wounds, especially such as contain foreign bodies. One may add multiple wounds, even though not at all serious. In the moderate and serious cases, it is indispensable to repeat the injections with the dose of from 10 to 15 c.c. if the first injection was 30 c.c., or with a much stronger dose if the first injection was only 10 c.c., using from 20 to 30 c.c., according to circumstances, at intervals of from seven to eight days, which makes it possible to avoid more easily many untoward results of an anaphylactic nature.

4. In the complications of frost-bite with phlyctenules, ulcerations or gangrene, the first dose should be from 20 to 30 c.c.; and, according to the advice of Raymond, the injection should be repeated with a dose of from 10 to 15 c.c. for all these cases, and even with 20 c.c. in serious cases, at intervals of a week, until recovery.

5. In order to be fortified against late postoperative tetanus, one should use, as recommended by Bérard and Lumière, a preventive injection before every surgical intervention, no matter what. The dose in such cases will be from 10 to 20 c.c. according to the importance of the operation.

In discussing this communication, Dr. Phocas gave an account of six cases of tetanus encountered by him during his two years' experience with the war wounded. In two cases, in spite of two injections, tetanus appeared eleven or twelve days after the last injection. All cases developed without being incited by an operation; in other words, they were not postoperative, and Phocas has not had to ask himself the question whether tetanus serum should be injected before an operation. If it had been done, he would not have avoided a single case of tetanus, so far as these six patients are concerned. These considerations seem to afford the opponents of the serum some ground for persisting in their doubts as to the utility and the efficacy of the serum when used in man.

But we must not lose sight of the fact that all these cases of tetanus developed slowly and only partially, and that they were mild, chronic and benign, all of them being retarded cases. It cannot be denied that we are dealing here with a new disease that bears only a remote resemblance to the tetanus of the first period of the war. Also diagnosis is sometimes difficult. In all the cases the actual presence of the disease could not be established for several days after the appearance of the first symptoms, and Phocas is convinced that many other facts have passed unnoticed. It would seem that one is authorized in establishing a relation of cause and effect between the systematic antitetanic injections in the service at the front and the appearance of this retarded and attenuated disease in the base hospitals. Two injections are not always sufficient to protect the patient completely, but they are sufficient to arrest the course of the disease. As for the question whether the serum should be injected before an operation, Phocas' statistics seem to show that this question is sometimes badly put, and that it is not so much a question as to whether those to be operated on should be reinjected, as it is whether all the wounded who arrive at the base hospitals should not be reinjected. Phocas has almost reached the point of believing that this action should be taken, and that all the wounded coming from the front should be reinjected once, at least, if not several times, until the cicatrization of their wounds has been brought about.

Meal Hours

I reported in my preceding letter a communication from Dr. Bergonié to the Académie des sciences on the modification of meal hours. At a recent meeting of the academy Dr. Amar declared with reference to this communication that the work ration of 3,200 calories proposed as a maximum by Bergonié is in reality insufficient, asserting that the work ration usually exceeded 4,000 calories. He remarked that the meal hours proposed by Bergonié, namely, 7:30 a. m. and 6 p. m., if accepted as the hours for the two principal meals, might serve as well for the night workers and the noctambulists. Amar concludes, however, that the custom of taking two principal meals, one at noon and the other toward 8 p. m., supplemented by a light breakfast on rising, is justified from the standpoint of experimental hygiene and the loss of human energetics. Supporting his view by a series of carefully conducted researches, he maintained that the carbohydrates are utilizable thirty minutes after their ingestion, which signifies an economy of 5 per cent. as regards expenditure of energy, whereas the nitrogenous foods are difficult to utilize for the first two hours after meals. Under these circumstances, it would be advantageous, while continuing to work and to eat at our usual hours, to consume farinaceous foods and fruits in abundance, and to devote at least ninety minutes to each of our two principal meals.

Gift from an American University

The University of Columbia, through the intermediation of M. Jusserand, the French ambasador, has just presented to the municipality of Lyons the proceeds of a prize of $2,000, which it has bestowed on the work of Edouard Herriot, mayor of Lyons, "Les oeuvres de guerre lyonnaises." This sum will constitute the first donation toward a Franco-American sanatorium founded by the municipality for the reception of tuberculous patients.

Marriages

ASST. SURG. OVID CLEMMONS FOOTE, U. S. Navy, Norfolk, Va., to Miss Eleanor Potter of Chicago, in New York City, July 12.

ARTHUR G. KESSLER, M.D., Battle Lake, Minn., to Miss Agnes P. Reinmiller of Pelican Rapids, Minn., July 25.

WILLIAM FRANKLIN TEMPLE, JR., M.D., Boston, to Miss Marguerite Mayberry of Pittsfield, Mass., July 10.

FRED ROMER REED, M.D., Detroit, Mich., to Miss Julia Davis of Rock Island, Ill., in Detroit, July 18.

PHILIP EDWARD MARKS, M.D., Pittsburgh, to Miss Elizabeth Kennedy Toddie, Braddock, Pa., July 16.

P. A. SURG. ROBERT EARLE STOOPS, U. S. Navy, to Miss Ethel Louise Saunders of Cleveland, July 9.

HOMER MARLATT MCINTIRE, M.D., Eveleth, Minn., to Miss Eileen Matthews of Ashland, Wis., July 10.

HOMER MCCLELLAND CARTER, M.D., to Miss Eleanor Hardy Keller, both of Madison, Wis., July 16.

ROY ALTON MORTER, M.D., to Miss Jannette B. Johnson, both of Kalamazoo, Mich., July 18.

NORMAN CLYDE MARVELL, M.D., to Miss Marguerite M. Hogg, both of Baltimore, July 7.

NICHOLAS ISRAEL FOX, M.D., Chicago, to Miss Evelyn Adele Hattis of Oak Park, Ill., July 5.

ISAAC IVISON PARSONS, M.D., to Miss Elizabeth G. Hennessey, both of Media, Pa., recently.

ALGIE RAY SHREFFLER, M.D., St. Louis, to Miss Edna Hitterbrand of Henry, Ill., recently.

MILTON J. LONGSWORTH, M.D., to Mrs. Anna Beutelspacher, both of Lima, Ohio, July 13.

LEO JOSEPH WOJCZWNSKI, M.D., to Miss Mary D. Rzepski, both of Philadelphia, June 20.

Deaths

William Beer Ewing, M.D., Pittsburgh; University of Pittsburgh, 1896; aged 51; a Fellow of the American Medical Association; professor of dermatology and syphilis in his alma mater; a member of the staff of St. Francis, Allegheny General and the Children's hospitals, Pittsburgh; for several years president of the Pittsburgh Academy of Medicine and treasurer of the Allegheny County Medical Society; died at his home, in Schenley Farms, Pittsburgh, July 17, from heart disease.

Darlington J. Snyder, M.D., Columbus, Ohio; Columbus (Ohio) Medical College, 1891; aged 74; a Fellow of the American Medical Association; assistant secretary and treasurer of the National Confederation of State Examining and Licensing Boards, in 1910; for twenty-seven years principal of the Reynoldsburg (Ohio) Academy; died suddenly, July 15, from heart disease.

Odillion B. Weed, M.D., Detroit College of Medicine and Surgery, 1888; aged 65; a Fellow of the American Medical Association; surgeon of the Thirty-Third Michigan Infantry, U. S. V., during the war with Spain, and later a medical officer of the Forty-Second New York Infantry, U. S. V., with service in the Philippine Islands; died at his home, July 17.

F. G. Marrero, M.D., Covington, La.; Tulane University, New Orleans, 1884; aged 62; formerly a member of the Louisiana State Medical Association; for one term coroner of Jefferson Parish and for five terms mayor of Covington; died in the Presbyterian Hospital, New Orleans, July 13, from cerebral hemorrhage.

Charles Young, M.D., Newark, N. J.; College of Physicians and Surgeons in the City of New York, 1866; aged 75; formerly a Fellow of the American Medical Association; for many years a member of the staff of St. Michael's, St. Barnabas and the Newark City hospitals; died at his home, July 14.

Harry Joseph James, M.D., Phoenix, Ariz.; University of Toronto, 1907; a member of the Arizona Medical Association; vice president of the Anti-Tuberculosis Society of Arizona and medical director of St. Luke's Home, Phoenix; died in that institution, July 20, from nephritis.

Harry Rayburn Johnson, M.D., New Hope, Ala.; University of Nashville, Tenn., 1887; aged 54; a member of the Medical Association of the State of Alabama; a member of the Madison County Medical Board; also a druggist; died in a hotel in Huntsville, Ala., July 7, from dropsy.

Frederick A. Rettig, M.D., Chicago; Rush Medical College, 1894; aged 48; a Fellow of the American Medical Association and president of the staff of Alexian Brothers Hospital, with which he had been associated for twenty-five years; died at his home, July 21, from myocarditis.

Thomas W. Hurley, M.D., Bentonville, Ark.; Memphis (Tenn.) Medical College, 1855; aged 83; a member and once president of the Arkansas Medical Society; a surgeon in the Confederate Service, during the Civil War; died at the home of his son in Bentonville, July 15.

Sigismund Edward Inda, M.D., Buffalo; University of Buffalo, N. Y., 1913; aged 26; formerly a member of the Medical Society of the State of New York; was drowned, July 18, when his automobile overturned in a shallow ravine, near South Dayton, N. Y.

Leland A. Moss, M.D., McMillen, Mich.; Cincinnati College of Medicine and Surgery, 1902; also a druggist; aged 41; died at his home, July 7, from the effects of a gunshot wound of the head, self-inflicted, it is believed, with suicidal intent, while despondent.

Guy Stewart Vinyard, M.D., Colorado Springs, Colo.; Denver and Gross Medical College, Denver, 1903; aged 40; formerly a Fellow of the American Medical Association; a member of the Colorado State Medical Society; died at his home, July 15.

Edward Barnwell Bangasser, M.D., Buffalo; University of Buffalo, 1913; aged 31; a member of the Medical Society of the State of New York; was drowned by the overturning of his automobile into a ditch, near South Dayton, N. Y., July 18.

James Louis Williamson, M.D., Milwaukee, Wis.; Northwestern University School, Chicago, 1881; aged 61; formerly a Fellow of the American Medical Association; a member of the Medical Society of the State of Wisconsin; died about July 16.

James Goravar Amerig Davies, M.D., Dalton, N. Y.; Druidic University of Maine, Lewiston, 1882; aged 79; a Fellow of the American Medical Association; died in Oakland, N. Y., April 12, from heart disease.

James B. Maclin, M.D., Shreveport, La.; Meharry Medical College, Nashville, Tenn., 1887; aged 56; the first colored practitioner of medicine and dentistry in Shreveport, died in Mercy Sanitarium in that city, July 3.

Edwin Nelson Mayberry, M.D., South Weymouth, Mass.; University of Vermont, Burlington, 1882; aged 60; a Fellow of the American Medical Association; died at his home, July 14, from cerebral hemorrhage.

John Francis Curlette, M.D., Monticello, N. Y.; New York University, New York City, 1889; aged 64; local surgeon of the New York, Ontario & Western Railway; died at his home, July 14, from septicemia.

Charles Henry Call, M.D., Greeley, Colo.; Harvard Medical School, 1881; aged 58; formerly a Fellow of the American Medical Association; died at his home, April 7, from an overdose of a narcotic.

Harry V. Lucas, M.D., Louisville, Ky.; University of Louisville, Ky., 1880; aged 66; for many years a practitioner and druggist of Louisville; died at his home, July 14, from organic heart disease.

Albert Eugene Greer, M.D., Brownstown, Ill.; Marion-Sims Medical College, St. Louis, 1895; aged 49; a Fellow of the American Medical Association; died at his home, July 3, from pneumonia.

Lucien F. Bachelder, Rockland, Maine (license, Maine, act of 1895); aged 81; a veteran of the Civil War; also a clergyman of the Methodist Episcopal Church; died at his home, July 10.

Samuel Birkbeck, M.D., Gratiot, Wis.; College of Physicians and Surgeons, Keokuk, Iowa, 1898; aged 50; a Fellow of the American Medical Association; died suddenly at his home, July 3.

Charles Miller Ginn, M.D., Dayton, Ohio; Cleveland-Pulte Medical College, Cleveland, 1899; aged 41; a member of the staff of Miami Valley Hospital; died at his home, July 13.

George Elmer Bushnell, M.D., Rochelle, Ill.; Hahnemann Medical College, Chicago, 1885; aged 52; formerly a Fellow of the American Medical Association; died at his home, July 17.

Ira Walton Marstellar, M.D., White Haven, Pa.; University of Vermont, Burlington, 1884; aged 58; for eighteen years school director; died at his home, July 11, from kidney disease.

Adolph E. Loberg, M.D., Minneapolis; University of Minnesota, Minneapolis, 1901; aged 41; a Fellow of the American Medical Association; died at his home, July 18, from pneumonia.

Hannah Leah Nichols Schmalling, M.D., Fulton, Ill.; University of Michigan, Ann Arbor, 1885; aged 54; a Fellow of the American Medical Association; died at her home, July 14.

Isaac Seldon Graves, M.D., Jermyn, Pa.; New York University, New York City, 1888; aged 57; a Fellow of the American Medical Association; died at his home, July 16.

Charles S. Castellaw, M.D., Fort Worth, Tex., Georgia College of Eclectic Medicine and Surgery, Atlanta, 1903; aged 35; died in a sanatorium in Fort Worth, July 14.

Oscar Henry Barthel, M.D., Pocahontas, Iowa; Rush Medical College, 1885; aged 60; a member of the Iowa State Medical Society; died at his home, July 17.

Julius A. Roeder, M.D., Omaha Medical College, 1892; aged 68; also a druggist; died at the home of his mother in Omaha, July 13, from heart disease.

Ferre Joel Walker, M.D., Maquon, Ill.; College of Physicians and Surgeons, Keokuk, Ia., 1896; aged 51; died in Brunswick, Mo., April 13.

William Allen Dumbauld, M.D., Carterville, Mo.; Cincinnati College of Medicine and Surgery, 1845; aged 70; died at his home, about July 9.

Richard Floyd Worth, M.D., San Benito, Tex.; Chicago Homeopathic Medical College, 1888; aged 53; died at his home, about July 23.

Walter J. Saunders, M.D., Wyoming, Pa.; Baltimore University, 1891; aged 62; died at his home in West Wyoming, July 15.

Correspondence

THE USE OF PAPER AS A SURGICAL DRESSING AND BANDAGE

To the Editor:—During the past six months we have been experimenting at the New York Orthopaedic Dispensary and Hospital with the use of paper as a surgical dressing, and our experiments there warrant me in making this preliminary report of its use in the hope that other surgeons may try it, that further experience may prove it to be a substitute for gauze, muslin, etc., and that its use will effect a great economy in the expense of our surgical work.

Among our experiments we have used sterilized newspapers in the dressing of clean wounds, and have found them perfectly satisfactory, causing no irritation and no disturbance whatever. We have also used various forms of paper, such as those used in making towels, toilet paper, table cloths, napkins, etc., in the dressing of clean wounds, and have had no trouble whatever. We have used sterilized newspapers also in the dressing of suppurating wounds, but it is believed doubtful if these are sufficiently absorbent for this purpose. It is believed, however, that further study from the manufacturer's standpoint will produce a paper sufficiently absorbent for suppurating wounds. We have used sterilized newspapers also as padding under plaster, with considerable saving, as cotton, lint and felt are very expensive. In the matter of bandages, there is not the slightest difficulty, as they can be made pliable and with sufficient tensile strength to be used for almost any purpose for which an ordinary bandage is used.

No attempt has been made to use paper as packing, as thus far we have found no paper that would not become disintegrated.

RUSSELL A. HIBBS, M.D., New York.

UNNECESSARY OPERATIONS

To the Editor:—Will you permit a humble medical and surgical practitioner, whose chief means of keeping even at the rear of the medical procession is through reading the better medical journals, to express her opinion as to one of the reasons why unnecessary operations are advised so frequently—fear of being considered out of date by fellow practitioners, and a conscientious desire to do all that may be done for the relief of patients. Had we the courage of our convictions, many of us of humble attainments would decline to operate or advise operation in debatable cases, but our literature is so emphatic that we fear to obtrude our opinion.

The remedy for this lies with our investigators, who should be less hasty in writing conclusions that may have to be revised.

Appendectomy for indefinite symptoms, tonsillectomy for remote affections, and intraspinal and intraventricular medication are mentioned merely to show how bewildered an ordinary surgeon may become on some of the debatable phases of these operations. Hasty publication by eminent authorities of conclusions drawn from incomplete data is the cause of many absurd and tragic operations.

JESSIE C. FARMER, M.D., Felton, Calif.

SHORTAGE OF SYNTHETIC DRUGS

To the Editor:—To facilitate the manufacture of synthetic drugs in this country and thus to relieve the shortage and reduce the exorbitant prices which have resulted from the war, the National Research Council has established a committee on synthetic drugs.

Having been asked to assume the chairmanship of the committee, I have selected, as my associates, M. Gomberg, of the University of Michigan; Roger Adams, of the University of Illinois, and W. A. Puckner, secretary of the Council on Pharmacy and Chemistry.

It being the purpose of the committee to aid in relieving the present shortage of synthetic drugs, its efforts will extend in two main directions: In the first place, to assemble reliable information as to which drugs are really hard to obtain or, if obtainable, are sold at an exorbitant price. In the second place, to organize research work, especially in universities, and to assist manufacturers in working out the problems of the production, on a large scale, of synthetic drugs of a high degree of purity without great delay.

Physicians are cordially invited to notify W. A. Puckner, 535 North Deaborn Street, Chicago, of any difficulty they may find in procuring important synthetic drugs. It is essential that the committee obtain this information, because certain firms have been asserting that they can supply synthetics which, according to the reports of physicians and of pharmacists, are exceedingly scarce, are sold at an outrageous price, or are altogether unobtainable. In other words, the committee would like to have information from physicians and pharmacists, and not from self-interested dealers or agents.

JULIUS STIEGLITZ, Chicago.

[COMMENT.—The medical profession and the American manufacturers are to be congratulated that Professor Stieglitz, head of the Department of Chemistry of the University of Chicago, and one of the foremost organic chemists of the country, has assumed the chairmanship of this important committee—a committee which may be the means of permanently freeing us from dependence on Germany for many of our synthetic drugs. In order that the committee's energies may be wisely conserved, physicians and pharmacists should report any shortage of the synthetic drugs which they deem most important and which in the past have been imported.—ED.]

THE NEURASTHENIC AS A SOLDIER

To the Editor:—In a note in THE JOURNAL (July 28, 1917, p. 290) Sir William Osler warns examiners of recruits against certain defects which will render men unfit for service in the field, and mentions "the neurasthenic." This reminds me of facts also worthy of recognition in connection with the examination of recruits which deserve to supplement in a measure the caution given by Dr. Osler. A certain number of men of unstable brain and nervous system will present themselves who, while all surface indications seem favorable, still are especially apt, whenever brought under severe or strenuous conditions, to suffer a breakdown or collapse of brain and nervous system.

Many of the neurasthenics mentioned by Dr. Osler are also "psychasthenics." By this I mean persons lacking in power of adaptation to severe external conditions, such as necessarily occur in connection with active military service.

It is especially important to know the previous history of such men, especially from a neuropsychopathic standpoint, and to inquire carefully into any sickness or disability that may have affected them. They should in particular give an account of any sojourn in any hospital or medical institution, and supply the names of physicians who have advised or treated them in the past.

Individuals of the "moron" type often present an entirely satisfactory physical appearance, and require tests which will develop mental incapacity or deficiencies.

In these categories there are many young men coming from sedentary occupations who might be capable of certain forms of service in the home camps, as Sir William Osler suggests. With the discipline and outdoor life, these men will improve both mentally and physically, and will even render brilliant service after passing successfully through the "try out." But they ought never to be sent to the front.

In this connection, it is worthy of note that an important movement has been inaugurated by the American Neurological and the American Medico-Psychological Associations for establishing neuropsychopathic units to supplement the work of base hospitals by especial care and treatment of the neuroses and psychoses. Dr. Pearce Bailey of New York has charge of this work, and has appointed men in each state of the Union to cooperate. I understand that two or three complete units of this class have already been formed and are in readiness to take the field. Dr. Bailey's address is 50 Union Square, New York.

RICHARD DEWEY, M.D., Wauwatosa, Wis.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

SIGNS OF ADDICTION TO OPIUM

To the Editor:—During this stage of China's fight against opium, our hospital is often called on by the officials of the district to express its opinion as to whether or not a certain person is a user of opium or its derivatives. Do you know of any tests which might be of use to us in collecting this evidence?

G. L. HAGMAN, M.D.,
Nantungchow Christian Hospital, Nantungchow, Kiangsu, China.

ANSWER.—The confirmed opium eater usually has a sallow, pasty complexion, and is emaciated. He is restless, irritable and unable to remain quiet for any very long period of time. The mental condition, except when he is directly under the influence of the drug, is usually one of depression. The pupils, except when under the direct influence of the drug, are usually dilated, but sometimes unequally. Pseudoneuralgic pains are common, and notably gastric-intestinal symptoms, as gastralgia, vomiting and diarrhea, especially if the drug is withheld. The skin is wrinkled, dry and harsh, and may show numerous needle scars and abscesses in those addicted to the hypodermic use of the drug. In most instances the diagnosis must be made by a careful investigation of the patient's habits and history.

CLOTHING ALLOWANCE FOR BRITISH MEDICAL RESERVE OFFICERS

To the Editor:—I do not see why the War Department does not give the physician who is commissioned an officer in the Medical Reserve Corps an allowance to cover his initial outfit. I know that when England called on her physicians at the declaration of war, each man commissioned was given £50 for his outfit. Please publish this so I can see the opinions of other men, members of the Medical Reserve Corps. Kindly omit my name and address. M. H. L.

ANSWER.—Although the writer — a member of the Medical Reserve Corps — asks to have his name omitted, we publish his letter because it calls attention to a fact that should be known, namely, that in Great Britain the temporary medical officers, corresponding to our Medical Reserve Corps officers, do receive an allowance; but it is £30 — approximately $150 — not £50. Incidentally, the doctor also is allowed a gratuity of £60, or approximately $300, at the termination of his term of service, if it has been satisfactory.

"SHUT YOUR MOUTH AND SAVE YOUR LIFE"

To the Editor:—The special article on "Medical Mobilization and the War" by Sir William Osler, Bart., refers to a certain pamphlet by Kit Catlin, one I would be pleased to have, as the title "Shut Your Mouth and Save Your Life" appeals to me as a good one. I should be pleased to know where it can be obtained. If you can supply me with it or give me the name of its publisher I should be grateful to you.

D. B. BUHLER, M.D., Pretty Prairie, Kan.

ANSWER.—The book referred to is:

Catlin, George: Breath of Life; or Malrespiration and its Effects Upon the Enjoyments and Life of Man, New York, 1861, 76 pp. John Wiley & Sons.

The English edition was published under the title:

Shut Your Mouth and Save Your Life, London, Trübner & Co., 1869.

The book is out of print, but can probably be obtained second-hand.

Protection from the Pseudoscientist.—The government has at last begun to realize that it is its duty to protect the masses from the medical quack. Your speaker is of the opinion that the masses need equal protection from the irresponsible literateur or politician who makes it his business to spread the seed of fanaticism and emotionalism by a claim of knowledge of biology which he does not possess. The cure for this form of pernicious mischief is the spread of knowledge of the exact sciences which will put an end to the business of the pseudoscientist.—Dr. Jacques Loeb, *Science*, Jan. 26, 1917.

Book Notices

REST, SUGGESTION AND OTHER THERAPEUTIC MEASURES IN NERVOUS AND MENTAL DISEASES. By Francis X. Dercum, A.M., M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College, Philadelphia. Second Edition. Cloth. Price, $3.50 net. Pp. 395. Philadelphia: P. Blakiston's Son & Co., 1917.

As the author states in the preface, this work is a reprint of Volume VIII of Solis-Cohen's "System of Physiologic Therapeutics," largely rewritten and revised. It is an epitome of the author's ideas of the neuroses and psychoses and their treatment. In the main, his ideas are sound. Here and there one might call them old-fashioned. But especially in the sections on treatment will the reader find a rich fund of common-sense directions obviously based on wide experience. Not all neurologists would agree with the author in the great preponderance he gives to neurasthenia as a "fatigue neurosis" compared with his scant consideration of psychasthenia; but when it comes to practical advice as to carrying out the rest cure and the management of nervous patients, there can be no difference of opinion. The author knows what he is talking about. The book contains many hints or pointers familiar to neurologists but seldom seen in print. Finally there is a consideration of suggestion, hypnotism, mesmerism, Christian Science, etc., and some twenty pages devoted to a criticism of psychanalysis. The sections on hypnotism and the like are largely of historical interest, though the author emphasizes his radical opposition to hypnotism as a therapeutic measure. The criticism of psychanalysis is a fair statement of the origin of this "cult," as the author calls it, and of its weaknesses, inconsistencies and possible dangers. His attitude may be said to be that of an alien enemy.

NOTES ON MILITARY ORTHOPAEDICS. By Colonel Robert Jones, C.B., Inspector of Military Orthopaedics, Army Medical Service. With an Introductory Note by Surgeon-General Sir Alfred Keogh, G.C.B., Director-General, Army Medical Service. Cloth. Price, $1.25. Pp. 132, with 128 illustrations. New York: Cassell & Co., Ltd., 1917.

This book is composed of a series of articles which appeared in the *British Medical Journal* during 1916. Col. Robert Jones is the leading orthopedic surgeon of England, and, it will be remembered, is the head of the unit of twenty orthopedic surgeons who recently went from this country to do war work in England.

There is an introductory note by Surgeon-General Keogh, who calls attention to the importance of the after-treatment of military surgical cases, in a way making the disabled soldiers an asset rather than a permanent liability to the community.

The chapters concern: (1) positions of election for ankylosis following gunshot injuries of joints; (2) suture of nerves, and alternative methods of treatment by transplantation of tendon; (3) the soldier's foot, and the treatment of common deformities of the foot; (4) malunited and ununited fractures; (5) transplantation of bone, and some uses of the bone graft; (6) disabilities of the knee-joint, and (7) the mechanical treatment of fractures under war conditions. By far the most interesting and important chapter for the ordinary practitioner and for the medical officer in general is the third chapter. This is very practical and easily understood. Particularly noteworthy is the statement of the qualities of a good marching boot, which follows:

A good marching boot should, therefore, leave the foot free to adapt itself to altering conditions of balance and strain.

1. The boot should fit comfortably and closely round the heel and ankle so as to avoid lifting of the heel in the boot, which results in chafing, ending in a blister of the heel.

2. To save the arch from giving way and to avoid flat-foot, the heel of the boot should be slightly higher on the inner side than on the outer.

3. The inner side of the boot should be straight right up to the tip of the big toe—that is to say, the inner sides of the two boots should be parallel to each other all the way along to the great toe. There should be no trace of pointedness, for pointedness tends to produce hallux valgus and helps to cause flat-foot.

4. The sole of the boot inside should be as broad as the foot with the weight of the body on it. In the case of a soldier it should be as broad as the foot is when carrying the weight of the soldier in full marching order—that is to say, the weight of the man himself, his pack, and all his accoutrements.

5. The upper of the boot should not compress the fore part of the foot in any way. The toecap should be stiff and deep enough to clear the toes and allow free movement inside the boot. This stiffening should run back on the inner side of the boot to a point behind the metatarsophalangeal joint of the great toe.

6. The boot should be long enough to allow the foot to extend to its full length when the soldier is carrying his pack and all his accouterments.

These last points, dealing with freedom of movement of the fore part of the foot, are essential to the full development of the small muscles of the foot on which the soldier's endurance and marching powers depend to so large an extent.

Corns do not develop in a foot encased in a boot which allows free play to the fore part of the foot. The regimental chiropodist is a most valuable asset, but his existence is, *ipso facto*, a confession that the fit of the men's boots is not all it might and ought to be. The man should not be allowed to judge of the tightness of his boot when his foot is cool. On the contrary, boots should be served out when men have come in from a long route march, and their feet are engorged with blood, and therefore at their largest. If this were done, interference with the circulation of the foot by the boot would less often occur. When a foot swells after a march, the swelling is practically all in the fore part, not round the heel. To serve out boots, therefore, after a route march would not prevent a man from choosing a pair which fitted properly round the heel and ankle.

ACUTE POLIOMYELITIS. By George Draper, M.D., Associate in Medicine, College of Physicians and Surgeons, Columbia University. With a Foreword by Simon Flexner. Cloth. Price, $1.50 net. Pp. 149, with 19 illustrations. Philadelphia: P. Blakiston's Son & Co., 1917.

A forword by Dr. Simon Flexner recommends Draper's book as a practical guide for the diagnosis, care and specific treatment of epidemic poliomyelitis. Dr. Draper has been engaged in poliomyelitis work for several years, and is therefore qualified to speak as one who has practical knowledge of the subject. In the first chapter the author gives a history of the disease and then considers in regular order etiology, epidemiology, experimental poliomyelitis, pathology, classification of the types of poliomyelitis, symptoms, clinical pathology, the paralyses, prognosis and treatment. The last part of the book is devoted to case reports with discussion. Some of this material appeared in Dr. Draper's recent extensive article in THE JOURNAL. As to the new organism recently described, the author says:

> Whether or not the polymorphous organism described by Mathers, Rosenow, and others and having affinities with the streptococcus is the same biological entity as that of Flexner and Noguchi is a question which the accumulative weight of scientific observation and experiment will determine. At the present writing adequate proof of a relationship has not been brought.

The book can be especially recommended to those physicians who feel the necessity of making a special study of this disease.

RATIONAL SEX ETHICS. A Physiological and Psychological Study of the Sex Lives of Normal Men and Women, with Suggestions for a Rational Sex Hygiene. By W. F. Robie, A.B., M.D., Superintendent Pine Terrace, Baldwinville, Mass. Cloth. Price, $3.50 net. Pp. 356. Boston: Richard G. Badger, 1916.

In the present flood of literature on sex topics, it is refreshing to find an author who writes from the point of view of the general practitioner and who has endeavored to secure his material from normal persons rather than from the abnormal, the eccentric or the criminal classes. Dr. Robie seeks to discuss some of the perplexing problems of sex relations in a common sense way without obscuring his meaning by the complex terminology and fantastic theories of many writers in this field. He is even able to discuss psychanalysis dispassionately and, without going to the extremes of the freudian enthusiasts, to recognize the value of many of Freud's theories. The numerous case histories given are well selected as illustrations, and in many cases will be recognized as analogous to those encountered by most practicing physicians. While not intended to be either complete or final, Dr. Robie's book can hardly be overlooked by those interested in this subject.

SOME PERSONAL RECOLLECTIONS OF DR. JANEWAY. By James Bayard Clark. Cloth. Price, $1. Pp. 36, with 1 illustration. New York: C. P. Putnam's Sons, 1917.

In this little book the author, a former assistant of Dr. Janeway, gives some personal incidents and memories of the life of the noted pathologist and sanitarian who died in 1911. The memoir will be of decided interest to those who knew Dr. Janeway.

Medicolegal

Classification of Prostatitis Regardless of How Caused

(Bartallotte vs. Commercial Casualty Insurance Co. (N. Y.), 163 N. Y. Supp. 95)

The Supreme Court of New York, Appellate Term, First Department, reverses a judgment entered in favor of the plaintiff who, having had prostatitis, sought to recover on a health insurance policy which provided: "The insurance hereunder shall not cover any disability . . . sustained by the insured . . . which shall result directly or indirectly from venereal diseases, childbirth, or any disease of the generative organs or their appendages, or any disease or injury, fatal or nonfatal, not common to both sexes, anything herein to the contrary notwithstanding." The court says that the defense was that the plaintiff's disability was due to an illness not within the terms of the policy, being a disease of a generative organ (the prostate gland) not common to both sexes. The contention of the plaintiff was that the disease of the prostate gland was due primarily to a germ infection of the nose and throat, and therefore came within the general terms of the policy, and not within the exemption set forth in the provision quoted above. This view, apparently adopted by the trial judge in directing judgment for the plaintiff, was not supported by the proof. The evidence was uncontradicted that, whatever its remote cause, the immediate illness which caused the disability of the assured was prostatitis, a disease of the prostate gland, a generative organ, not common to both sexes. The physician whose preliminary report was filed by the plaintiff with the defendant testified that the plaintiff had acute prostatitis, and that he had a high fever and painful symptoms, a condition due to urinary trouble. On further examination, the physician stated that he had been told that, a week before he examined him, the plaintiff had been suffering from the nose and throat; that at that time, on examining the plaintiff's nose and throat, he found symptoms of follicular tonsillitis, and rhinitis in the nose, and stated further: "My opinion was that this infection was a secondary infection from throat trouble, and it traveled down to the gland." Under the terms of the policy it was immaterial what caused the prostatitis, whether the causes were external or internal, hereditary, or an incident of old age or early dissipation. The exemption was as to disability resulting from such diseases. The motion made by defendant's counsel at the close of the case to dismiss the complaint on the ground that the plaintiff had failed to make out a cause of action should have been granted, the proof being conclusive that the plaintiff's disability was due to an illness for which, under the policy, the plaintiff had no right to recovery.

Insufficient Evidence of Malpractice in Treatment of Fracture

(Snearly vs. McCarthy (Ia.), 161 N. W. R. 108)

The Supreme Court of Iowa affirms a judgment in favor of the defendant, who was sued for damages for alleged malpractice in the treatment of a simple oblique fracture of the femur of the plaintiff's right leg. The court says that while the method of treatment adopted by the defendant was fully pointed out and described in the testimony, no witness was called by the plaintiff to show that this was not regarded as proper practice by the profession in the locality where the defendant practiced. If there was any such testimony, it was to be inferred from what the defendant did, or failed to do, viewed from the standpoint of a nonexpert, or deduced from what some of the medical experts said while on the stand. As a general rule, it may be safely affirmed that in matter requiring special skill and training it is not permissible for laymen as nonexperts to set up any artificial standards as to methods of treatment. This is especially true in surgery; for in that field neither courts nor juries are presumed to know more regarding methods of treatment than ordinary laymen, and that is practically nothing. After hearing the theories, deductions, and scientific facts from experts, both

judge and jury must often oppose one set of opinions against another and determine which is the more reasonable, but they cannot, without some guide, presume to fix any standard on which to determine the correctness of any kind of treatment. It was claimed that the defendant was negligent in not using the Roentgen ray before he did anything toward reducing the fracture, but the testimony showed that it is entirely optional with physicians and surgeons whether to use the Roentgen ray or not in the first instance. The purpose, of course, in using it is to diagnose the case, and if this may properly be done without the use of this modern appliance, then no negligence is to be inferred from failure to use it. Moreover, the record here showed that the nature of the fracture was discovered when the defendant was first called; hence a Roentgen-ray examination would have added nothing. There was a nonunion of the bones for some reason which the experts failed to explain, except to say that nature fails sometimes to make the necessary union, without any fault being attributed to the operator. This theory was fortified by the further fact that, after the plaintiff had been taken to Chicago and placed in the hands of one of the most skilful operators in the country, he, too, had to resort to three operations before he secured a union, and the shortening of the limb resulted after he took the case in charge. It did not appear that this final shortening of the limb was due to anything which the defendant did or neglected to do. It might be true, of course, that he should be held liable for the delayed union, or for pain and suffering and loss of time, although not responsible for the permanent shortening of the limb; but to hold him liable for this, it must be shown that these things resulted proximately from his lack of care in handling the case. As the plaintiff selected the grounds of negligence on which he would stand, stating them with great particularity, and nowhere claimed that the defendant failed to give him the necessary constitutional treatment to aid nature in throwing out the callous or bony substance which cements the ends of broken bones together, that proposition must be eliminated from the case. Nor, after the plaintiff had been permitted to show that some years before he had suffered another fracture—one of the bones below the knee, was there error in denying him the right to show how long he was disabled by reason of that other fracture, as the fractures were not similar in kind or nature.

Consideration for Promise to Pay for Services for Another

(Baumhauer vs. McGill (Ala.), 73 So. R. 753)

The Court of Appeals of Alabama, on account of what it holds was an erroneous instruction given to the jury at the instance of the defendant, reverses a judgment that was rendered in his favor in this action on a promise to pay for medical services for another. The instruction read: "Gentlemen of the jury, you must be reasonably satisfied from the evidence in this case that J. I. McGill promised to pay Dr. Baumhauer for the services rendered for Austin Sims in this case, and that the promise grew out of a consideration moving to said McGill; otherwise you must find for the defendant." The court says that the plaintiff based his right of recovery on a contract claimed to have been made by him directly with the defendant, whereby the defendant contracted for him to render medical services to one Austin Sims, the beneficiary of the defendant's bounty. In this aspect of the case, it was not, as charged, a sine qua non or indispensable condition to recovery "that the promise grew out of a consideration moving to said McGill"; it was sufficient though the consideration did not "move" or insure to the benefit of McGill, but for the benefit of a party not privy to the contract. It is thus expressed in 1 Elliott on Contracts, Section 252: "While the consideration must move from the promisee at the instance of the promisor, it is not necessary that the promisor be the recipient of it. It need not pass directly to the latter, but under the prevailing rule may move from the promise to a third person at the promisor's request." The detriment to the promisee (Dr. Baumhauer) in the performance of services and loss of time was a sufficiently valuable consideration. In view of the erroneous instruction, the judgment for the defendant must be reversed, and the cause remanded for another trial.

Society Proceedings

COMING MEETINGS

Michigan State Medical Society, Battle Creek, Sept. 4-6.

AMERICAN ASSOCIATION OF ANESTHETISTS

Fifth Annual Meeting, held in New York, June 2, 1917

Dr. F. W. NAGLE, Vice President, in the Chair

Officers Elected

The following officers were elected for the ensuing year: president, F. W. Nagle, Montreal; vice presidents, Albert H. Miller, Providence, R. I.; Isabella C. Herb, Chicago, and Freeman Allen, Boston; secretary-treasurer, James T. Gwathmey, New York.

A Comparative Study of Blood Pressure During Anesthesia

DR. ALBERT H. MILLER, Providence, R. I.: A comparative study of blood pressure was made under nitrous oxid-oxygen anesthesia. Anesthetic dosage and vapor tensions are comparatively stable, but occasional instances of personal susceptibility and recalcitrance were noted. The dosage required to maintain a definite degree of anesthesia increases in proportion to the severity of the operative procedure. The requisite dosage for anesthesia during shock is greatly diminished, but this diminution of dosage bears no direct relation to the blood pressure. Excitement and examination, preliminary to operation, increase blood pressure. Cyanosis, retching and vomiting during anesthesia all cause an immediate rise of from 10 to 30 mm. The systolic pressure is increased in the lithotomy position. Overdosage required by recalcitrant patients does not affect blood pressure materially, whereas overdosage necessitated by operative trauma makes for shock. McKesson's rule is of the greatest practical value. He characterizes typical shock by a diastolic pressure of 60 mm. or less, a pulse pressure of 20 and a pulse rate above 120. If this state is allowed to continue half an hour, the patient will not recover. Serious operations under local anesthesia are regularly attended with wide but transient variations in both systolic and diastolic pressure. Spinal anesthesia is attended by falls in both pressures of alarming proportions.

Effects of Anesthesia on the Blood Volume and Its Relation to the Production of Shock

DR. ALBERT A. EPSTEIN, New York: Most authorities now recognize that the most striking pathologic feature of shock is the reduction of the total quantity of blood in the body. Anesthesia plays an important rôle in the production of shock because, of itself, it causes a prompt and considerable reduction in the blood volume. While pursuing researches on the blood sugar changes in experimental diabetes, I was forced to the conclusion that the hyperglycemia observed under operative conditions was to some extent due to a concentration of the blood, caused by the reduction of the blood volume. Animal experiments were made on forty-one cats, under anesthesia, some with, others without operative interference. Susceptible animals show a prompt reaction in the blood volume, while in refractory animals the changes in blood volume were insignificant. Experiments were performed to show that this blood volume reduction is not due to concentration of cellular content. While increased salivation and mucous secretion as well as sweating may, in a measure, account for some of the reduction in blood volume under anesthesia, it seems probable that abstraction of the fluid by the tissues, from the blood, plays the major part in the production of the phenomenon observed. The occurrence of acidosis during anesthesia and the mobilization of lipoids favor development of a condition in the tissues which renders them hydrophilic, that is, capable of absorbing fluid. The fact that refractory animals show the slightest reaction would rather rule out acapnia as an etiologic factor. The reduction in blood volume, in animals susceptible to anesthesia, occurs promptly and is slightly increased by operation. Mere prolongation of anesthesia does not materially affect the reaction. Recovery from the anes-

thesia is accompanied by a return of the blood volume to normal.

Effects of Ether Anesthesia and of Visceral Trauma, as Shown by Vasomotor and Blood Pressure Changes

DR. WALDEN E. MUNS, Columbia, Mo.: In a series of experiments on dogs it was found that (1) ordinary third stage ether anesthesia prolonged beyond one hour results in marked vasodilatation of peripheral vessels; (2) there is a direct relationship between the condition of the vasomotor control and the blood pressure, and (3) the end-result of ether depression is loss of vasomotor function, and death. The normal tone and resistance in the arteries were altogether or partly destroyed in all cases, and the blood pressure lowering effect of this one factor, obtaining throughout all of the periphery, was tremendous. It is evident that as half the cases showed a decided and fatal fall in blood pressure, while the other half recorded a decided maintenance of pressure to the time of death, the normal compensatory reaction of the heart to the blood pressure lowering tendency of the peripheral dilatation must be taken into consideration. While the heart beat did not increase in any instance in rate, there was a decided increase of ventricular output, an increase great enough to overcome the hypostatic effect of the peripheral dilatation. If the heart fails to show this compensatory reaction, because of organic disease, or too early response of the nervous system to the effect of the anesthetic, the blood pressure must fall. The results of a series of intestinal trauma experiments showed that : (1) manipulation of the intestine brings about a vasoconstriction, and (2) there is a relationship between this vasoconstriction and the blood pressure. Thus it is apparent, in the light of these results, that an anesthetic, such as ether, and an irritation of the abdominal viscera, produce two different kinds of stimuli. The anesthetic first excites and then depresses, the depression being its essential and marked effect, and if too prolonged it results in total functional incapacity. The effect of visceral irritation is wholly excitatory, being mechanical. When this irritation becomes too severe or is continued too long, the summated excitant stimuli lead to overactivity and fatigue, and the end of fatigue is exhaustion. Thus both the anesthetic and the visceral injures may lead to complete depression or complete exhaustion, respectively. Either means complete functional incapacity. When sensory stimuli and the anesthetic are exhibited together, there is one period when the excitation from the surgical technic and the depression from the drug are pitted against each other to the good of the patient. If the anesthetic and its neutralizing irritation are continued too long, or are of undue severity, the two antagonists become allies in effect and bring about a much quicker collapse. Thus the syndrome known as postoperative shock may be considered a combination of the effects of excitation and depression, and varies directly with the interaction of these two factors. If the prevention of postoperative shock depends on a proper balance between the two types of stimuli, then both surgeon and anesthetist should quite properly understand such relationship and so govern the interaction of the stimuli that they will not be too severe, too long continued or too out of balance. It is also obvious that postoperative ether depression must be handled in a manner different from exhaustion from sensory shock.

DISCUSSION

DR. S. J. MELTZER, New York: Undoubtedly there is something in Henderson's contention that acapnia produces shock and that rebreathing is a proper form of treatment. But not all physiologists accept his views, and I question whether the decreased carbon dioxid content causes shock or shock causes the decreased carbon dioxid content. Similarly, it would be difficult to determine whether the loss of blood volume causes shock or shock causes the decreased blood volume. With regard to recovery following low blood pressure, systolic or diastolic, in experiments on animals I have found that irrespective of pressures as low as 20 systolic, if respiration could be maintained, all animals recovered. Life is, after all, dependent on the integrity of respiration and circulation, but the latter will withstand more variation than the former; in this connection it must always be remembered that ether paralyzes the peripheral nerve centers, and respiration is much less than normal during anesthesia. Animals will recover from nine or even thirty-six hours of anesthesia, if respiration is sufficiently well maintained. The control of this one factor so important in the preservation of life assists in controlling the other.

DR. JAMES T. GWATHMEY, New York: In working with one of our surgeons, it has been my custom to use saline hypodermoclysis at the beginning of each operative procedure that will last an hour or more. This preliminary hypodermoclysis enables the surgeon to obviate the occurrence of shock, and 95 per cent. of the patients so handled come off the operating table with a pulse of 72, normal respiration, and in a most favorable condition for recovery. With regard to the rôle of the anesthesia in precipitating acidosis: Series of guinea-pigs have been anesthetized with ether-air and ether-oxygen, some receiving preliminary sodium bicarbonate alkalinization. Those pigs not receiving the sodium bicarbonate were all acidosed, whereas those which received the sodium bicarbonate showed normal or raised alkalinity of the blood. Further, pigs anesthetized with ether-oxygen showed a higher percentage of alkalinity than those anesthetized with ether-air.

DR. E. I. MCKESSON, Toledo, Ohio: In regard to the question of cardiac compensation, I have seen a number of cases in which the systolic blood pressure has been reduced 40, 50 or 60 mm. for a few moments, and the patients recovered; but when extremely low pressures have persisted for from twenty to thirty minutes, the longer they continued the less likely was the patient's recovery. These patients may not die for two or three days, but they do die. They seem unable to recover cardiac tone. When diastolic blood pressure is reduced, but the systolic pressure is maintained at practically the normal, we have a cardiac compensation which saves the life of the patient. The heart moves a larger volume of blood at each stroke, and thus sustains systolic pressure. The double pressure maintains circulation, and saves the patient, even though the diastolic pressure, which is the measure of the hypotonus, has indicated that the patient is approaching, but has not yet reached the stage of surgical shock. When the heart from organic disease, severe strain, infection or rapid action has been worn out, or worn to the point at which it will no longer compensate, we have a crisis in which the patient is apt to go into surgical shock and not recover. It may take several days before the patient will finally succumb to heart exhaustion.

Anesthesia in Orthopedic Surgery

DR. WALTER G. ELMER, Philadelphia: In orthopedic surgery, whether the operation is to be of short or long duration, we keep our patients very lightly anesthetized. The anesthetic is not continued for the application of the plaster-of-Paris dressing. Thus a double osteotomy for knockknee requires not more than six minutes of anesthesia and operating, while the plaster work lasts half an hour; but the child receives no ether during this period, and on account of this discreet use of anesthesia, we almost never see any of our little patients go into a state of shock. Anesthesia, however deep, does not block subconscious pain. In weak and delicate children a slight amount of conscious pain may act as a stimulant, whereas severe pain, necessarily inflicted under anesthesia, combined with the effects of profound anesthesia, may lead to collapse. Children with tuberculosis of the spine on whom a bone grafting operation is to be done are hazardous risks. These children, while conscious and in control of their voluntary muscles, are able to protect themselves from harm while being handled; but when relaxed and unconscious under ether, this power of self-protection is lost. The child's body is limp and unresisting. Care in handling is of the utmost importance, as an abscess may be ruptured at the seat of the disease, causing sudden or ultimate death. Even the spine itself may buckle and be broken. These children should be handled as carefully as though they were made of fragile glass, and from the time the anesthetic is started, they should be held motionless on a rigid support which fixes the spine from the head to the pelvis.

DISCUSSION

DR. JOHN R. WORLEY, Dallas, Texas: In view of the damage that may result from buckling of the spine under the relaxation of even light ether anesthesia, the question arises as to whether nitrous oxid-oxygen anesthesia is not preferable for orthopedic surgery. While supposedly contraindicated in young children, specialists in anesthesia are finding nitrous oxid-oxygen increasingly available even in infants. I have seen a number of children, under a few weeks of age, kept under perfect nitrous oxid-oxygen anesthesia for orthopedic surgery and other prolonged operations, without any untoward consequences.

Vascular Reflexes with Various Tensions of Ether Vapor

DR. FRANK C. MANN, Rochester, Minn.: In general, the physiologic phenomena occurring under ether were found to be remarkably constant at the same tension in different dogs. While the effects of different tensions on blood pressure, the vascular reflexes, respiration and the respiratory reflexes were not always progressive or absolutely constant, yet there were certain narrow limits of tension within which certain changes always occurred. With a more accurately calibrated apparatus (than the one experimented with) I believe all the reflexes will be found to be proportionate to the anesthetic tension used. It was found that the lowest tension compatible with operative work on the dog was approximately 36. The optimum tensions for operative work are probably between 38 and 45. While blood pressure and respiration may both be depressed greatly, it seems impossible to kill an animal with any tension within these limits, provided time is not allowed to become a factor. When the tension is increased above 48, the animal becomes profoundly anesthetized, and respiration is liable to fail and blood pressure to fall to a very low level. Tensions above 60 are fatal for the dog. The corneal reflex does not persist at tensions above 45. Blood pressure may remain practically the same or be successively slightly decreased at each increase of tension up to 48. It is always greatly decreased by tensions at or over 50. It reaches zero under tensions between 50 and 60. The pressor vascular reflex produced by stimulation of the central end of the vagus is greatest at tensions between 36 and 45. It is decreased under tensions above 45, although a well-marked rise usually occurs under all tensions up to 48. It is either absent or only barely perceptible at a tension of 50, and rarely present at all above this tension. The pressor vascular reflex produced by stimulation of the central end of the sciatic is depressed by all tension above 45 and does not persist at tensions above 50. The pressor reflex of the sciatic seems to be depressed more greatly by increased tension than that of the vagus. In the instances in which it was possible to study the depressor reflex, it appeared to parallel quite closely the pressor reflex in the same nerve under the same tensions, although it did not persist under quite as high tensions. Respiration usually ceases under a slightly lower tension than the pressor vascular reflex of the vagus disappears, although either one may fail slightly before the other.

DISCUSSION

DR. F. W. NAGLE, Montreal: Clinically I have noted the same difference in the calibration of the anesthetometer that Dr. Mann noted in comparisons of tensions with the gas balance. In using the Connell apparatus during the past year I have utilized pressures from 50 to 60, the lower pressure providing an efficient anesthesia only for children or very weak patients.

DR. S. J. MELTZER, New York: While it has been stated that the same tension of ether in all individuals produces the same effects, it must be understood that, no matter how accurately an apparatus has been made, animals and persons vary in their susceptibility to anesthetics, and consequently the biologic element in percentage methods of anesthesia remains variable and occasionally disconcerting. The apparatus is reliable enough, but the individual reaction remains unstable. Thus tensions and pressures can only be approximated in relation to their usual results.

DR. B. VAN HOOSEN, Chicago: Dr. Mann's investigations offer a scientific explanation why ether and chloroform, following scopolamin-morphin narcosis, should never be pushed to the point of abolishing reflexes. Should the reflexes become inadvertently abolished, the supplemental anesthetic must be withdrawn until they again become active.

DR. FRANK C. MANN, Rochester, Minn.: Working with a somewhat inaccurate apparatus makes my conclusions open to question; but I feel justified in holding that within limited range of tensions you get the same phenomena in all individuals. In animal experimentation one can readily sense the variations in response to different tensions, and I believe it can be established, with a more accurate adjustment of the apparatus, that within limited range of tensions, all animals of a species will respond similarly.

(To be continued)

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Anatomy, Philadelphia

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1 Factors Involved in Excavation of Cavities in Cartilaginous Capsule of Ear in Human Embryo. G. L. Streeter, Baltimore. —p. 1.
2 Metopism. L. Bolk, Amsterdam.—p. 27.
3 Frequency of Localized Anomalies in Human Embryos and Infants at Birth. F. P. Mall.—p. 49.
4 Cytologic Observations on Behavior of Chicken Bone Marrow in Plasma Medium. R. Erdmann, Princeton, N. J.—p. 73.
5 Relationships and Histogenesis of Thymus-Like Structures in Ammocetes. I. E. Wallin, Milwaukee.—p. 127.

American Review of Tuberculosis, Baltimore

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6 *War Tuberculosis Program for Nation. H. M. Biggs.—p. 257.
7 Lessons from Canada's War Experiences with Tuberculosis. J. H. Elliott, Toronto.—p. 267.
8 Prognosis in Tuberculosis from Standpoint of Occurrence of Hemoptysis and Tubercle Bacilli in Sputum. F. H. Heise, Trudeau, N. Y.—p. 280.
9 Study of Signs and Symptoms of Automatic Disturbance Occurring in Pulmonary Tuberculosis. M. S. Cohen, Philadelphia. —p. 289.

6. **War Tuberculosis Program.**—It is suggested by Biggs that the services of voluntary experts in tuberculosis be employed in various parts of the country in the examination of recruits for the army who show any signs or symptoms suggestive of pulmonary disease, or in whom the history indicates its possible existence. And that an expert in the physical examination of the chest should make an examination before enrolling an applicant whose history shows that he has at any previous time had any illness resembling in character pulmonary tuberculosis; who gives a history at any previous time of an attack of pneumonia or pleurisy; whose history shows that one or more members of his immediate family (father, mother, brother, sister, etc.) has had pulmonary tuberculosis, or died of this disease; every man with a flat chest whose weight as compared with his height is 15 per cent. below the normal; every man who gives a history of chronic catarrh or who has a cough or any symptoms of any disease in the chest; every man in whom any abnormal physical signs of any kind are found in the chest. A careful history of previous illnesses should be taken in the case of every recruit, and preserved. This history should also include the history of his immediate family as to typhoid. (In the latter case if the man has suffered from typhoid the Widal test and an examination of the urine and feces for typhoid bacilli should be made). In any instances in which there is a cough with sputum, the sputum should be examined, and, if negative, it should be reexamined at least two or three times. Any man with even a very limited amount of pulmonary tuberculosis that is latent or arrested, is almost certain to break down under the physical strain of military training

and army life and a focus of disease previously latent or arrested will almost certainly become active. Systematic and complete periodic reexaminations should be made of all troops within three months after enrolment and at intervals of three months thereafter.

Every soldier who has had a cough for a period of two weeks, or any other symptom of pulmonary disease, or whose general physical condition has undergone a serious deterioration, should, if necessary, be isolated and referred to an expert for reexamination, and every soldier showing any definite signs or symptoms suggestive of pulmonary disease (when a positive diagnosis is not possible) should be placed under expert observation until a positive diagnosis can be made, or until the existence of pulmonary tuberculosis can definitely be excluded. Cases in which a positive diagnosis of pulmonary tuberculosis has been made should receive sanatorium or hospital treatment, preferably in institutions located in their home states, since homesickness is likely to counteract the beneficial effects of climate in remote localities. It is also recommended that an educational campaign on matters relating to the conservation of the health of troops be carried on in connection with all military training camps.

Archives of Internal Medicine, Chicago

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10 *Pulse Flow in Brachial Artery. Influence of Certain Drugs. A. W. Hewlett, San Francisco.—p. 1.
11 *Study of Case of Diabetes Insipidus with Special Reference to Mechanism of Diuresis and of Action of Pituitary Extract on It. C. D. Christie and G. N. Stewart, Cleveland.—p. 10.
12 *Multiple Hemangiomas of Skin Associated with Dyspituitarism. G. D. Head, Minneapolis.—p. 24.
13 *Phthisis Pulmonalis and Other Forms of Intrathoracic Tuberculosis. W. A. Gekler, Chicago.—p. 32.
14 Study of Small Outbreak of Poliomyelitis in Apartment House, Occurring in Course of Epidemic in Large City. M. T. Burrows and E. A. Park, Baltimore.—p. 56.
15 *Influence of Splenectomy on Metabolism in Anemia. W. Denis, Boston.—p. 79.
16 Electrocardiogram; Its Relation to Cardiodynamic Events. C. J. Wiggers, New York.—p. 93.
17 *Studies of Blood in Beriberi. I. Yoshikawa, K. Yano and T. Nemoto, Tokyo.—p. 103.
18 Renal Function in Patients Convalescing from Acute Fevers. A. Bookman, New York.—p. 112.
19 *Two Cases of Heart Block Associated with High Blood Pressure. J. H. Musser, Jr., Philadelphia.—p. 127.
20 Studies in Variations of Tonus of Gastric Musculature in Health and Disease. B. B. Crohn and A. O. Wilensky, New York.—p. 145.

10. **Pulse Flow in Brachial Artery.**—Of the drugs studied by Hewlett, nitroglycerin, pituitary extract, veratrum viride, atropin, strophanthin, camphor, epinephrin and strychnin, only the first two produced definite and unmistakable alterations in the size and form of the volume pulse recorded from the arm of man. Nitroglycerin caused the pulse to become larger and more pointed, while pituitary extract had the opposite effect. The fall of pressure produced by adequate doses of veratrum viride is not accompanied by definite changes in the pulse form. In this respect the action of this drug differs essentially from the action of nitroglycerin.

11. **Diabetes Insipidus.**—The regulation of the excretion of water by the kidney was studied by Christie and Stewart in a case of diabetes insipidus. It was supposed that on account of the high degree of the diuresis, the great quantity of water ingested and transported, and the marked diminution in the excretion and ingestion caused by pituitary posterior lobe extract, the conditions for such a study would be unusually favorable. The conductivity of the blood serum was slightly increased and the relative volume of serum slightly diminished when the water excretion was lessened by posterior lobe extract or by water restriction. The blood flow in the hands seemed to be increased during the antidiuretic action of posterior lobe extract. This, so far as it goes, supports the view that a vascular effect in the opposite direction on the renal vessels may be responsible for the diminution in the urine excretion. It was shown that under the action of posterior lobe extract the kidneys had the power of effecting a considerable concentration of the urine. Other kidney functional tests gave a normal response. Accordingly, no indication was obtained that the condition was in any way associated with a pathologic alteration in the kidney.

12. **Hemangioma of Skin.**—The two cases reported by Head are remarkable examples of multiple hemangiomas of the skin associated with clinical manifestations of pituitary gland changes. In one case the skin of the scrotum, penis, inside of the thighs, arms, back and abdomen was affected. In the second case the skin of the scrotum and the mucous membranes of the lips and mouth were involved.

13. **Phthisis Pulmonalis and Intrathoracic Tuberculosis.**—Roentgen-ray examinations of over 600 patients, with all forms of tuberculosis, and clinical and laboratory observation of over 2,500 such cases form the basis of Gekler's paper. He says that the primary tuberculosis of children is the result of direct inoculation by inhalation of either dried bacilli or droplets containing bacilli. The primary lesion is usually small and very often near the surface of the lung. The regional bronchial gland involvement is invariably present, and the symptomatology is caused by the bronchial gland disease. The bronchial gland tuberculosis of the adult may be a flaring up of a latent process which dates back to childhood, or may be the result of the infection of an adult who has never before come in contact with tuberculosis. Here again the symptoms are caused by the glandular disease. Phthisis pulmonalis is a bronchogenic metastasis from a diseased gland. In rare instances it may be caused by the reinfection from without of an already infected individual. Pleural tuberculosis, as it is known clinically, either dry or with effusion, is also a metastasis from a preexisting focus in a bronchial gland or in the lungs themselves. Possibly this may in rare instances be caused by a reinfection from without. Miliary tuberculosis is a hematogenous metastasis which also very often comes from a bronchial gland. This hematogenous metastasis may be such as to result in a general miliary tuberculosis, or in an abortive miliary tuberculosis with local manifestations in the kidneys, joints, etc. Lymphangitis tuberculosa as a clinical entity is a rather uncommon condition, in Gekler's experience, and the true tuberculous granuloma of the lungs, and presents a very different type of disease than any of the others. It is usually benign, with a good prognosis.

In many instances, in the majority perhaps, tuberculosis is a cryptogenic disease, and the organic manifestations are due to bronchogenic or hematogenous metastasis. From the standpoint of therapy it is of immense importance, to discover the crypts and use such treatment as will inhibit metastasis, rather than try to treat the metastatic disease after it has once manifested itself. Particular stress is laid on the diagnosis of bronchial gland tuberculosis before the development of metastasis with its very uncertain outcome.

15. **Influence of Splenectomy on Metabolism in Anemia.**—Metabolism studies were conducted by Denis before and after operation in six cases of anemia in which splenectomy was performed. These included two cases of pernicious anemia, two of Banti's disease, one of family jaundice and one of "atypical splenic anemia." It was found that while, in some of the cases examined, changes in the excretion of certain bodies occurred, these changes were not constant; thus in two cases the uric acid output was much increased after operation, in one it was reduced, while in three no change was noted. In a series of observations on the phosphate excretion it was found that while in five cases the output of phosphates by the kidney was increased after operation, in one it was decreased. It is of interest to note that there is no relation between these changes in uric acid and phosphate excretion and the increase in leukocytes noted in the blood counts made during the postoperative period. A study of the sulphur excretion showed no changes, either relative or absolute, which could in any way be attributed to the removal of the spleen. Blood analyses did not confirm the findings of King and Eppinger regarding the increased content of fat in the blood after splenectomy; cholesterol was found to be more or less increased in every case.

17. **Studies of Blood in Beriberi.**—The authors found that the quantity of urea in the blood of beriberi patients shows,

in mild cases, no deviation from the normal, but in the majority of severe cases a marked increase. Ambard's coefficient is not infrequently higher than normal in beriberi; that is, the function excreting urea is frequently disturbed. The disturbance of the kidney function does not necessarily coincide with the gravity of the clinical manifestations. Even in cases in which the clinical symptoms are severe, if the function excreting urea is intact, the prognosis is hopeful. It is possible that cardiac failure in beriberi is due to an accumulation of some unknown toxic products in the blood, the elimination of which is coincident with the elimination of urea.

19. **Heart Block Associated with High Blood Pressure.**—Two cases of heart block with extremely high systolic pressure are recorded by Musser. Evidence is offered to show that this high pressure is dependent more on increased blood mass discharged by the left ventricle than on the associated cardiac hypertrophy and peripheral sclerosis.

Archives of Ophthalmology, New Rochelle, N. Y.

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21 Ocular Anaphylaxis. Rôle of Uveal Pigment. A. C. Woods, Philadelphia.—p. 283.
22 Glioma Retinae and Atrophia Bulbi. D. F. O'Connor, Worcester, Mass.—p. 298.
23 Sarcoid of Eyelid. G. Derby, Boston.—p. 312.
24 Pressure Signs of Certain Intracranial Conditions Observable in Fundus of Eye. W. Sharpe, New York.—p. 320.
25 Report of One Hundred and Three Successive Cataract Operations; Eighty-Three in Capsule, Twenty with Capsulotomy. C. B. Medling, New York.—p. 331.
26 Ideal Intracapsular Cataract Extraction. L. Mills, Los Angeles.—p. 344.
27 Blockage of Trephine Opening after Elliot Operation. J. W. Stirling, Montreal, Canada.—p. 352.
28 Case of Unilateral Vertical Nystagmus Acquired in Adolescence, and caused by Accident. A. Lutz, Havana, Cuba.—p. 357.

Boston Medical and Surgical Journal

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29 Use of Precipitin Test for Detection of Human Blood in Criminal Trials. W. R. Stokes and H. W. Stoner, Baltimore.—p. 65.
30 Syphilis in Internal Medicine. W. P. Boardman, Boston.—p. 72.
31 *Comparison of Several Methods of Specific Early Treatment of Acute Anterior Poliomyelitis. H. Ulrich, Boston.—p. 78.
32 Technic and Interpretation of Dental Roentgenograms. H. McIntosh, Boston.—p. 84.
33 Preparation of Animal Food Proteins for Anaphylactic Tests. R. P. Wodehouse and J. M. D. Olmsted, Boston.—p. 85.
34 *Body Types in Epileptics. M. B. Hodskins, Palmer.—p. 87.

31. **Several Methods in Treatment of Poliomyelitis.**—The 120 cases studied by Ulrich were divided into six groups, each group being treated in a different manner. Group I was treated with three intraspinal injections of immune serum; Group II was treated similarly with normal serum; cases of Group III were injected with their own spinal fluids (autotherapy—Duncan); Group IV comprised cases on which the effect of simple withdrawal of spinal fluid was tested; Group V received no specific treatment; Group VI includes cases of which one was of doubtful diagnosis, one died of pneumonia, and the others were moribund on admission. The immediate effects showed no apparent differences in the various series. A comparison of the results obtained shows that none of the measures used had any favorable influence whatever on the progress or outcome of a single case. Ulrich concludes, therefore, that not only must the various measures employed in this study be looked on as useless, at least after the onset of paralysis and under the conditions under which the investigation was carried out, but the manipulation of the sufferers necessarily attendant on lumbar puncture causes great pain, and would seem to be permanently harmful in view of the great need of rest during the early stage of the disease.

34. **Body Types in Epileptics.**—One hundred and fifteen patients are included in Hodskins' study, which, on analysis, gave forty-seven carnivores, 40.8 per cent.; eight herbivores, 6 per cent., and sixty normals, 52.1 per cent. The causes of the epilepsy in the carnivores, as determined by the clinical examination, are as follows: idiopathic, twenty-two; indigestion, seventeen; meningitis, four; diphtheria, two; hydrocephalus and alcohol poisoning, one each. In the normal group the determined causes were: encaphalitis, sixteen; meningitis, ten; cerebral hemorrhage, seven; birth injury, three; rachitis, six; blow on head, congenital syphilis, diphtheria, pneumonia and sunstroke, one each; measles, two; idiopathic, four; indigestion, seven. On further analysis it was found that, in the carnivorous group, 10 per cent. were due to organic causes, and in the normal group, 60 per cent. Thirty-six per cent. of the carnivores and 48 per cent. of the normals had a hereditary tendency.

California State Journal of Medicine, San Francisco

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35 Nonsuture Ocular Tendon Shortening with Results of Forty Operations. R. O'Connor, Oakland.—p. 232.
36 Glaucoma; Methods of Treatment. H. Barkan, San Francisco.—p. 235.
37 Treatment of Iritis. M. W. Fredrick, San Francisco.—p. 239.
38 Early Surgical Treatment of Squint. V. H. Hulen, San Francisco.—p. 243.
39 Tumors of Kidney. H. C. Moffitt, San Francisco.—p. 246.
40 Diagnosis and Treatment of Nephrolithiasis. W. E. Stevens, San Francisco.—p. 250.
41 Acute Dilatation of Stomach. Report of Six Cases, Three Occurring During Anesthesia. F. B. Reardan, Turlock.—p. 253.
42 Mercurialized Serum Injections in Syphilitic Nervous Diseases. H. G. Mehrtens, San Francisco.—p. 255.
43 Economic Importance of Well Poised Person. H. L. Langnecker, San Francisco.—p. 256.
44 Fractures in War Time. L. Eloesser, San Francisco.—p. 259.
45 Leukopenia, Its Significance. J. H. Catton, San Francisco.—p. 264.
46 Subdeltoid Bursitis. S. T. Pope, San Francisco.—p. 268.
47 Two Cases of Poisoning from Use of Alypin in Urethra. L. C. Jacobs, San Francisco.—p. 268.
48 Common Injuries of Eye and Their Treatment. H. Barkan, San Francisco.—p. 270.

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49 Diagnosis and Treatment of Congenital Pyloric Stenosis. C. G. Grulee and D. D. Lewis, Chicago.—p. 459. To be continued.
50 *Acidosis in Diabetes and Nephritis. C. D. Christie, Cleveland.—p. 481.
51 Epidemiology of Whooping Cough in Cleveland for 1915 and 1916. G. E. Harmon, Cleveland.—p. 487.
52 Clinical Forms of Nervousness. A. R. Timme, Cleveland.—p. 491.

50. **Acidosis in Diabetes and Nephritis.**—About seventy determinations were made by Christie on the blood of patients afflicted with varying degrees of nephritis for acidosis. He used the methods of determining the carbon dioxid tension in the alveolar air and the volume of carbon dioxid in the blood and at the same time attempted to correlate the results obtained by the use of the so-called Sellards test in some of the patients. In addition he estimated the total nonprotein nitrogen or the urea content of the blood. The results obtained show that not all patients having incompetent kidneys for the excretion of nitrogen show the same incompetency for the excretion of acids. Usually if there was a high degree of accumulation of nonprotein nitrogen in the blood there was at the same time some lowering of the alkaline reserve of the blood. Very frequently mild accumulations of nonprotein nitrogen were encountered with a normal alkaline reserve. Instances also show that there may be no accumulation of nonprotein nitrogen in the blood of nephritics but at the same time very marked lowering of the alkaline reserve. Varying degrees of acidosis are encountered very frequently in nephritis. Usually they are only of moderate severity and are largely due to phosphate and sulphate retention. Occasionally it may become of severe degree with complicating factors. It is usually present in uremia, but doubtless plays a small part in the phenomena. Rarely do the nephritic patients with their mild acidosis suffer any outward unpleasant symptoms. Another type of acidosis which may be of service eventually in the explanation of certain clinical phenomena is that due to the impaired elimination of the volatile acid carbon dioxid through the lungs.

Journal-Lancet, Minneapolis

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53 Acute Inflammation of Middle Ear. J. H. James, Mankato.—p. 474.
54 Auricular Fibrillation. W. G. Richards, Billings, Mont.—p. 478.

Kansas Medical Society Journal, Topeka

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55 Diagnosis and Reporting of Diseases in Its Relation to Public Health. J. J. Sippy, Topeka.—p. 177.
56 Some Indications for Use of Forceps. W. A. Gartner, Troy.—p. 180.
57 Diagnosis of Syphilis. L. A. Lynch, Kansas City.—p. 182.
58 Scarlet Fever. E. C. Wickersham, Independence.—p. 184.
59 Appendicitis as Viewed from Angles of Internist and Surgeon. F. A. Carmichael, Osawatomie.—p. 188.

Medical Record, New York

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62 Medical Ethics. F. H. Barnes, Stamford, Conn.—p. 59.
63 Mixed Types of Nephritis. H. M. Moses, Brooklyn.—p. 61.
64 Club Foot as Product of Evolution. T. Abbe, Washington, D. C.—p. 62.

Military Surgeon, Washington, D. C.

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65 General Administrative Methods, Sanitary Precautions, and Evacuation Service in Austro-Hungarian Army. J. H. Ford.—p. 1.
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68 Epidemiologic Study of Outbreak of Measles, Camp Wilson, San Antonio, Texas. E. L. Munson.—p. 63. To be continued.
69 Prevalence of Hookworm Disease in Fourth Texas Infantry, First Mississippi Infantry and First Alabama Cavalry Regiments. J. F. Siler and C. L. Cole.—p. 77.
70 U. S. Public Health Service; Functions and Value as Preparedness Asset. W. C. Billings.—p. 100.

Nebraska State Medical Journal, Norfolk

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71 Cardiac Arrhythmia. A. K. Detwiler, Omaha.—p. 323.
72 Theory of Psychic Causation in Insanity. L. B. Pilsbury, Lincoln.—p. 329.
73 Nervous States. G. W. Dishong, Omaha.—p. 331.
74 Congenital Hypertrophic Pyloric Stenosis. F. S. Clarke, Omaha.—p. 334.

New Orleans Medical and Surgical Journal

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75 Clinical Observations and Reactions in Leprosy. J. A. Honeij, New Haven, Conn.—p. 5.
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77 Influence of Present War on Treatment of Infected Wounds. K. W. Ney, New Orleans.—p. 20.
78 Unsuspected Chronic Appendicitis Recognized During Roentgen Examination of Gastro-Intestinal Tract. A. Granger, New Orleans.—p. 28.
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80 Spina Bifida; Report of Cases. E. D. Fenner, New Orleans.—p. 42.
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82 Operation for Hallux Valgus. E. S. Hatch, New Orleans.—p. 63.
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84 Ovarian Transplantation; Report of Cases. W. D. Phillips, New Orleans.—p. 73.
85 Registered Nurse. J. T. Crebbin, New Orleans.—p. 80.
86 Parenteral Injection of Milk as Curative Agent. T. J. Dimitry, New Orleans.—p. 83.
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88 What Tulane Has Done for Country in Times of War. R. Matas, New Orleans.—p. 90.

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89 Roentgen-Ray Diagnosis in Diseases of Chest. G. E. Pfahler, Philadelphia.—p. 53.
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92 Acute Appendicitis. A. Nicoll, New York.—p. 62. To be concluded.
93 Physical Examination in Pulmonary Tuberculosis. C. Rayevsky, Liberty.—p. 66.
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95 Mesenteric Venous Thrombosis Following an Abdominal Hysterectomy for Fibroids. M. Rabinovitz, New York.—p. 71.

Oklahoma State Medical Association Journal, Muskogee

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96 Bladder Stone; Report of Case. L. S. Willour, McAlester.—p. 275.
97 Treatment of Club Feet. R. L. Hull, Oklahoma City.—p. 278.
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99 Hysterectomy for Carcinoma of Uterus with Galvano-Cautery. V. Berry, Okmulgee.—p. 285.
100 Goiter. C. R. Phelps, Oklahoma City.—p. 290.
101 Stone in Bladder; Report of Case. W. G. Ramsey and B. T. McClure. McCurtain.—p. 293.

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104 Medical Men and War. J. W. Keefe, Providence.—p. 159.

Southern Medical Journal, Birmingham, Ala.

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105 Unwarranted Fear of Tuberculosis. C. H. Cocke, Asheville, N. C.—p. 539.
106 *Irrigation Method of Treating Flagellate Infection of Intestines. H. L. McNeil, Galveston, Texas.—p. 544.
107 Bothriocephalus Latus Infection; Report of Case. M. D. Levy and D. P. Wall, Galveston, Texas.—p. 546.
108 Pellagra; Its Etiology and Treatment. J. H. Graves, Waco, Texas.—p. 547.
109 Advances in Public Health Work in Louisiana During Past Year. O. Dowling, Shreveport, La.—p. 552.
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111 Diaphragmatic Hernia; Report of Case. J. F. Mitchell, Washington, D. C.—p. 561.
112 Acute Appendicitis with Peritonitis; Cases that Should Not Be Drained. J. W. Long, Greensboro, N. C.—p. 565.
113 *Acute Hematogenous Unilateral Infection of Kidney; Report of Case. J. M. Maury, Memphis, Tenn.—p. 567.
114 *Traumatic Asphyxia. J. G. Sherrill, Louisville, Ky.—p. 568.
115 Bathing Facilities and Habits of Soldiers and Officers of Army. C. C. McCulloch, Jr., Washington, D. C.—p. 572.
116 First Aid to Injured as it Applies to Railroads. R. W. Knox, Houston, Texas.—p. 581.
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118 Simple Enucleation and Evisceration of Eyeball are Unsurgical Technics. T. J. Dimitry, New Orleans.—p. 594.
119 Direct Laryngoscopy and Bronchoscopy. C. Stockard, Atlanta, Ga.—p. 600.
120 What Tulane Has Done for Country in Times of War. R. Matas, New Orleans.—p. 605.
121 Patriotism and Profession. J. N. Baker, Montgomery.—p. 608.
122 Relation of Medical School to Community. W. F. R. Phillips, Charleston, S. C.—p. 609.

106. **Flagellate Infection of Intestines.**—Direct irrigations of the duodenum with substances, toxic to these parasites, but harmless to the patient, are used by McNeil. The following solution has been used in numerous cases: methylene blue (medically pure), 5 grains; quinin sulphate, 20 grains; hydrochloric acid (concentrated), 30 mm.; distilled water sufficient to make 1 pint. This solution is injected directly into the duodenum through a duodenal tube to which a funnel is attached. About ten minutes is required for the injection. The fluid is injected warm. There is said to be absolutely no danger to the patient from such injections. As a preliminary to the treatment, it is advised to keep the patient on a liquid or semiliquid diet for two days preceding the injection and to administer a saline purgative on the preceding night. One such injection is given daily for three mornings, the last two injections, in an adult, being double quantity. On the evening of each day on which an injection has been given, an enema of 1:5,000 methylene blue is given high up into the colon. After three such treatments the patient is allowed to go about his business, but is instructed to return at the expiration of one month for further examination. On his return a saline purge is given and the stools following this purgative are examined very carefully for the presence of parasites.

113. **Acute Hematogenous Infection of Kidney.**—In Maury's case, the preoperative diagnosis was appendical abscess with the appendix turned outward and confined between the lateral wall of the iliac fossa and the cecum. Entering the peritoneal cavity through an incision over the mass, Maury found the

cecum high, the appendix normal and both closely applied to the mass which was in the cellular tissue behind the bowel and evidently connected with the lower pole of a kidney, which was displaced downward. Closing the incision and making one on the loin, an abscess was encountered in the lower pole of the kidney, which had ruptured through the capsule and infected the surrounding cellular tissue. Isolating and bringing up the kidney revealed no other lesion, so it was returned to its bed and the wound closed around a rubber drainage tube.

114. Abstracted in THE JOURNAL, Jan. 27, p. 309.

Southwestern Medicine, El Paso, Texas

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128 Use of Corpora Lutea in Treatment of Nausea and Vomiting of Pregnancy. E. J. Cummins, El Paso.—p. 38.
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133 Plea for Greater Care in Performance of Duty by Medical Officers at Recruiting Stations. A. Farenholt.—p. 318.
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137 Poisoning by Arseniuretted Hydrogen on Submarines. M. Giordano.—p. 342.
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142 Case of Uncinariasis with Severe Anemia. J. J. A. McMullin. —p. 380.

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150 Lactosuria; Case Presenting Unusual Features; Clinical Report. L. M. Warfield, Milwaukee.—p. 63.
151 Miners' Consumption. A. J. Lanza, Denver.—p. 64.

146. **Pneumonia in Children.**—Myers says that the best results are obtained by looking on the process as an intoxication rather than a localized inflammatory disease of the lungs. In addition to general measures an abundance of water to drink, sodium bicarbonate internally, and occasionally digitalis, are the only things mentioned. The soda seems to lessen the toxemia in many cases and thus to enable the child to pass through the period of illness with the minimum amount of discomfort and danger. Myers believes that when sodium bicarbonate is used freely the need for the treatment of special symptoms is greatly reduced. Perhaps for this reason digitalis seems to be required only rarely. Persistent or painful cough may call for a few doses of opium in some form, but it is better to administer it separately and only when it is needed to secure sleep, and not to give it in a mixture which is to be taken throughout the whole twenty-four hours.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Radiology and Electrotherapy, London

June, XXII, No. 1

1 Simplified Roentgen Ray Methods. H. C. Gage.—p. 1.
2 Roentgen Observations on Duodenum, with Special Reference to Lesions Beyond First Portion. J. T. Case.—p. 16. To be continued.

Glasgow Medical Journal

June, LXXXVII, No. 6

3 Maternity and Child Welfare Schemes: Responsibility of Local Authorities Under Notification of Births (Extension) Act, 1915. A. K. Chalmers.—p. 321.
4 Acute Cystitis. A. G. Faulds.—p. 336.

Indian Journal of Medical Research, Calcutta

April, IV, No. 4

5 *Vitality of Tubercle Bacillus Outside Body. M. B. Soparker.—p. 627.
6 Results of Bacteriologic Examination of Stools of Six Hundred and Fifty-Nine Cases of Cholera at Calcutta. E. D. W. Greig. —p. 651.
7 Bacteriologic Studies of Cholera-like Vibrios Isolated from Stools of Cholera Cases in Calcutta. E. D. W. Greig.—p. 658.
8 Study of Kala-Azar. J. W. Cornwall and T. K. Menon.—p. 672.
9 Experimental Immunization Against Rabies by Method of Phisalix. J. W. Cornwall and T. K. Menon.—p. 688.
10 Chemical Investigation of Varieties of Chaulmoogra Oil in Connection with "Leprosy Treatment." S. Ghosh.—p. 691.
11 *Hemolysis by Sodium Oleate and Sodium Gynocardate. W. D. Sutherland and G. C. Mitra.—p. 698.
12 Rôle of Blood in Ovulation in Culicidae. S. K. Sen.—p. 729.
13 Gireterakis Girardi (n. g., n. sp.) and Other Suckered Nematodes. C. Lane.—p. 754.
14 *Appearance of Malignant Tertian Rings in Blood During Intravenous Injections of Tartar Emetic. E. D. W. Greig.—p. 766.
15 Prevalence of Ankylostomiasis in Madras Presidency. K. S. Mhaskar.—p. 771.
16 *Improvements in Bacteriologic Media. New and Efficient Substitute for Nutrose. R. L. M. Wallis.—p. 786.
17 New Test for Chlorin in Drinking Water and Its Application for Estimation of Chlorin Present. R. L. Wallis.—p. 797.
18 Use of Aromatic Chloramin Compounds for Sterilization of Water for Drinking Purposes. R. L. M. Wallis.—p. 800.
19 Sprouting Capacity of Grains Issued as Rations to Troops. E. D. W. Greig.—p. 818.

5. **Vitality of Tubercle Bacillus Outside Body.**—It is evident from Soparkar's experiments that there is an appreciable period after the complete drying of tuberculous sputum, during which some of the tubercle bacilli contained therein remain alive. In the case of direct sunlight the time is approximately two hours; this interval is not long, and the danger of infection from tuberculous sputum deposited in open places exposed to the sun cannot therefore be considered to be great. In the case of sputum deposited in a place exposed to diffused daylight the interval during which sputum dust may remain infective can be calculated in days. But here, too, the tubercle bacilli soon lose their virulence if the place be well lighted, the rate at which the tubercle bacilli become devitalized probably depending on the intensity of the light. The danger of spreading infection is greatest when sputum is deposited indoors, especially in dark ill-ventilated places. In these conditions tubercle bacilli may retain their vitality and power to cause the disease as long as 309 days. From decomposing sputum living tubercle bacilli could be isolated after twenty days but not after twenty-six days. Bovine tubercle bacilli were found to be more resistant to sunlight and diffused daylight than human tubercle bacilli. When exposed to electric light the bovine bacilli were found alive for seventy-four days but dead after one hundred days. It took three to four hours in direct sunlight and three to four days in diffuse daylight for a pellet of sputum to become

sufficiently dried to be capable of being reduced to dust. The adoption of suitable building by-laws to ensure the entrance of sufficient light and air in all inhabited rooms in houses will do much to combat the spread of tuberculosis.

11. **Hemolysis by Sodium Oleate and Sodium Gynocardate.**—Sutherland and Mitra found that 0.16 c.c. of serum, homologous or heterologous, interferes with the hemolytic action of sodium oleate and the sodium gynocardates to such an extent that four times the dose of these which, when no serum is present, causes hemolysis of 5 c.c. of a 5 per cent. suspension of erythrocytes in two hours, has no effect within twenty-six hours. The proportions here are 0.16 c.c. of serum to 0.025 c.c. of erythrocytes. In vivo the serum and the erythrocytes are equal, but 1,000 times the minimum hemolytic dose of the gynocardates may kill a rabbit within five minutes. It is unlikely that the hemolytic effect has anything to do with the lethal result in such a case; the action of the soap on the lipoids of the heart muscle must be a factor in causing so rapid a result. Further experiments will be made as to the rôle played by rapid intravascular coagulation.

14. **Tartar Emetic and Malaria.**—Two observations are reported by Greig. In one during the intravenous injections of tartar emetic the benign tertian parasite appeared in the blood and produced fever, in the other fever occurred and malignant tertian rings appeared. If Rogers' observation be confirmed it would seem that tartar emetic has a very delicate selective action; it would appear to be capable of killing the protoplasm of the sexual form of malignant tertian parasite of malaria, but has little or no action on the asexual form.

16. **Substitute for Nutrose.**—A new and efficient substitute for nutrose has been prepared by Wallis from substances obtained in India, namely, casein 5 parts, peanut flour 94 parts, and sodium carbonate 1 part. This preparation combines ready solubility in water, with a high protein content, and consequently is of great nutritive value. This preparation when used for making the Conradi-Drigalski medium gives a transparent medium, on which the typhoid coli group of organisms grows with marked luxuriance. The property of stimulating the growth of organisms appears to be due to the presence of a vitamin associated with the globulin contained in the peanut flour. In view of the high protein content, and relatively small amount of carbohydrate present, this preparation is particularly useful for making bread for diabetic patients, and also for admixture with ordinary flour. The new preparation combines the properties of a highly nutritive foodstuff, containing a vitamin, and extreme cheapness.

Journal of Tropical Medicine and Hygiene, London

June 15, XX, No. 12

20 Seven Day Fever in Anglo-Egyptian Sudan. R. G. Archibald. —p. 133.

Lancet, London

June 23, I, No. 4895

21 Treatment of War Wounds. A. E. Wright.—p. 939.
22 *Masks for Facial Wounds. F. D. Wood.—p. 949.
23 Albuminuria in Trenches. H. B. F. Dixon.—p. 951.
24 Universal Arm Splint. G. E. Wilson.—p. 953.
25 *Temporary "Pilons." A. H. Bizarro.—p. 954.
26 Case of Pharyngeal Diverticulum. J. McClure.—p. 955.
27 Development of Trained Nursing in France. E. Montizambert. —p. 971.

June 30, No. 4896

28 Day's Work. A. Macphail.—p. 979.
29 Limitations of Vaccine Treatment. R. J. Rowlette.—p. 984.
30 *Treatment of War Heart. A. E. Garrod.—p. 985.
31 *Analysis of Cases of Tetanus Treated in Home Military Hospitals. D. Bruce.—p. 986.
32 Detection of Entamœba Histolytica and Its Cysts. A. C. Inman. —p. 990.
33 *Treatment of Trench Rheumatism and Allied Conditions by Colloidal Sulphur. J. D. Comrie.—p. 991.
34 Effect of Vaccinia on Well-Being of Children. J. P. Kinloch.—p. 993.
35 Sole Use of Reverdin's Needle. V. Bonney.—p. 994.
36 Ultraviolet Radiation. C. A. Schunck.—p. 996.
37 Case of Acute Intestinal Obstruction by Meckel's Diverticulum. E. M. Sympson.—p. 998.
38 Case of Suprapubic Hernia. W. H. Forshaw.—p. 998.
39 Case of Antral Abscess Treated with Salicylic Acid. P. R. Wilde. —p. 998.

22. **Masks for Facial Wounds.**—The cases treated by Wood are those in which the wounds or depredations of disease have been so severe as to remove them beyond the range of even the most advanced plastic surgical operations. A cast is made of the patient's face in plaster of Paris. All wound cavities are filled up with dressing and cottonwool, and these in turn covered with goldbeater's skin. The nostrils are blocked with cottonwool, the patient breathing through the mouth; if through the nose a quill is inserted for breathing throughout this operation. It depends on the area of wound as to whether nose or mouth breathing can be allowed during the process. Having obtained the mold and dried it slowly the next stage is to French-chalk it and take from it a clay or plasticine squeeze, which provides a positive model of the patient's healed wound and the surrounding normal tissue surface. This model is further developed by means of sittings of the patient, and this stage is completed by taking another cast—a negative.

The task now is to reconstruct the destroyed feature or features from the model taken from this negative mold, by building them up to match the corresponding or adjoining features of the patient, or from prewound photographs, taking the utmost care the whole time to keep the adjustment of the edges to the patient's face-planes. A cast is then taken of this; further manipulation is required for the fitting of an artificial eye (if the case includes such); a last comparison with the original is made, and the mask, in plaster, is complete. From this an electrotype plate is deposited. It is of pure copper, 1/32 inch in thickness. The necessary fitments for glass eye and attachments are fixed, and it is finally well covered with an electric deposit of silver. The last adjustments are now made to the patient's face, the securing of the plate to the face being carefully considered. The attachment is usually made by means of strong spectacles, but spirit-gum and ribbons have sometimes to be used, varying with the character of the wounded area. Everything depends on the efficiency of the attachments in the matter of comfort to the patient, which is necessary in such cases, so that his attention shall never be drawn to his deficiency unless necessarily. The adjustment must be exact, therefore, and the edges of the plate can in no case be allowed to part from the sections of the patient's skin with which they coincide.

The plate has now to be pigmented to match the complexion of the patient. A thin coating of cream colored spirit enamel forms a good basis for the subsequent flesh color matching, as it leaves the oil color mat when dry, which facilitates the blending of plate with face. If the patient has an oily or shiny skin a semblance is easily obtained by varnish rubbed down to match. The eyebrows are painted to match and the eyelashes are made of thin metallic foil, carefully soldered to the plate, cut finely by scissors, and tinted to match. Renewal of the pigmentation must be made from time to time, however, for scar tissue changes the contours of the face, and readjustments must occasionally be made. If these changes are very great a new plate might have to be substituted for the original.

25. **Temporary "Pilons."**—The material used by Bizarro consists of a wooden frame, easily made, poroplastic, webbing, plaster, bandages and a little felt. The first step in applying a pilon is to make a mold of the stump with poroplastic. With the patient standing (particularly in thigh cases) on the sound leg the bony tuberosities should be well marked, and the upper end of the first layer well adapted to them so as to support the weight of the body in walking. The lower end of this first layer, in the great majority of cases, is left open, and all the support of body takes place on the superior part of the tube. Having molded and fixed this inner coat of the pilon, keeping it very smooth on its inner face, it is covered with a few layers of plaster. Then, having tried it well on the patient, the wooden frame is measured, allowing for the heel of the boot, and is fixed to the inner cylinder by means of plaster. Webbing pieces are included in it, and when the plaster is dry, the inner cylinder is fixed to the frame by means of screws or rivets to make the whole more solid. For stumps of the thigh felt only is

used on the upper part of the poroplastic, and Bizarro emphasizes that in these cases the bottom of the cylinder is entirely open. To avoid softening of the structure of the cylinder due to perspiration, particularly in warm weather, holes of 5 cm. diameter can be drilled through the supporting belt which at the same time make the pilon lighter.

30. **Treatment of War Heart.**—Treatment by graduated exercises which has proved so useful in the differentiation and cure of the functional cases, Garrod says, is unsuitable and does actual harm in the organic cases, so long as the physical signs of damage to the heart muscle persist. The symptoms described by the patients are shortness of breath on exertion, inability to walk any distance, and, in some cases, precordial pain. The physical sign is an extension of the cardiac dulness toward the right, often to 1½ or 2 inches beyond the midsternal line. Only in extreme cases is there any conspicuous extension toward the left. The dull area has a clearly defined outline, and yields a sense of resistance on percussion. The resistance can also be appreciated by dipping with the pads of the fingers along the course of the ribs or intercostal spaces. Experience has convinced Garrod that the fitting treatment for such patients is complete rest until the cardiac dulness has returned to its normal limits and for at least a week afterward. The hearts of many patients which have not responded to modified rest have come in after complete rest has been imposed. The patient is not allowed to rise from his bed for any purpose, or even to sit up in bed for his meals; nor is he permitted to smoke. When the dilatation is recent the cardiac area may return to its normal limits within as short a period as a week. In cases of longer standing, in which rest has not been imposed at the outset, longer periods, up to six or eight weeks, have been required. As a rule, under such treatment, the heart does not redilate.

31. **Tetanus in Home Military Hospitals.**—In the 200 cases of tetanus under review by Bruce the mortality was 36.5 per cent. The greatest number of cases occurred between the ninth and the fourteenth days. Among the 200 cases, 102 patients are noted as having received a prophylactic injection of antitoxin in France immediately after being wounded. Only three patients are reported to have received prophylactic injections in home hospitals. Of these 102, seventy-four recovered and twenty-eight died, giving a mortality of 27.4 per cent. Of the remaining cases, there is no record of prophylactic treatment in eighty-seven, although in all probability most of them received it. Of these eighty-seven, forty-eight recovered and thirty-nine died, a mortality of 44.8 per cent. The remaining eleven patients are said to have had no prophylactic injection of any kind. Of these, five recovered and six died, a mortality of 54.5 per cent. Of seventy-two patients inoculated on day of wound the average incubation period was 29.5 days. Of the eleven patients who received no prophylactic inoculation the average incubation was 15.7 days. Out of the total of 200 cases the number of patients treated with antitetanic serum after the onset of symptoms was 198 (99 per cent.). Two patients did not receive therapeutic treatment with antitetanic serum in England; both died. There is no record that either of these men received a prophylactic injection in France. Of the 198 patients who received serum treatment, 127 recovered and seventy-one died; mortality, 35.8 per cent.

33. **Trench Rheumatism Treated with Colloidal Sulphur.**—Comrie has found intramuscular injections of colloidal sulphur to be of the very greatest value in the treatment of subacute painful conditions in the muscles and joints. The most satisfactory course of treatment consists of an injection administered every second day for three weeks (ten injections), combined with rest and with massage on the intervening days. In the greater number of subacute cases, lasting several months, complete recovery may be expected after three to five weeks from the commencement of the treatment. This method is also very helpful in lingering cases of gonorrheal rheumatism. It does not, however, take the place of salicylate of soda in relieving the pains of acute articular rheumatism.

Archives de Médecine des Enfants, Paris

June, XX, No. 6, pp. 281-336

40 *The Immediate and Remote Prognosis for Convulsions in Children. A. Collin and T. Revon.—p. 281.
41 *Diabetes Proving Fatal in Two Months in Girl of 15. P. Gautier and C. Saloz.—p. 314.
42 Present Status of Scleroderma in Children. J. Comby.—p. 318.

40. **Convulsions in Children.**—Collin and Revon assert that the old idea that the gravity of convulsions in children depends on the severity of the attacks, their frequency and the age of the child is no longer tenable. The prognosis depends exclusively on whether the convulsions are merely the manifestation of an overexcitable nervous system or are the initial symptoms of organic meningeal or brain disease. This, they say, can be determined by the character of the spasms. Clonic spasms are benign; the tonic are of grave import. Clonic convulsions are the expression of the infantile spinal type, as long as this lasts. They occur only on certain soils: an inherited neuropathic taint or an inherited alcohol taint. They are an episode during the course of a predisposition, not the beginning of organic disease. These clonic spasms can be brought on, with this predisposition, by any mechanical, toxic or physical cause for excitement of the cell. They are a manifestation of bulbomedullar excitation, not involving the cortex. In the clinic they are always bilateral, while in experiments made by stimulating the cortex they are always unilateral. Still another argument is the minimal symptoms on the part of other apparatus with them.

Tonic convulsions may, on the other hand, occur at any age and are the expression of some actual lesion of the cell. They may occur in any one who has an infection involving nerve centers. They can be produced by any physical, toxic, mechanical or infectious process modifying the histologic structure of the cell. They are the manifestation of some lesion of nervous tissue, as excitation of any point kept up long enough or intense enough will induce a tonic reaction, possibly accompanied by grave respiratory or cardiac symptoms. The later history of children with these benign or grave convulsions differs entirely. The former are neuropaths and they will present symptoms more or less often, but these symptoms do not correspond to any pathologic anatomy known to date. The children who have had tonic convulsions develop hemiplegia or epilepsy or succumb to meningitis or encephalitis, and in the immense majority of the cases pathologic processes can be discovered with the microscope. In short, as Collin and Revon reiterate, with any tonic phase in the course of a convulsive condition the prognosis should be reserved, both the immediate and the remote outlook. The article is based on protracted study of eighty cases of convulsions. Only seventeen were of the clonic type. These were mostly older children, and it was usually learned that other children in the family had had convulsions. The details of these cases and also of the sixty-three children with convulsions of the tonic, malignant type are tabulated. The reflex convulsion causes merely clonic movements without concomitant symptoms, and it is thus possible to determine the prognosis from the first convulsion. Any grave infection or intoxication damaging the nerve cell may bring on tonic convulsions even in a previously normal child.

41. **Rapidly Fatal Diabetes in Girl of Fifteen.**—Death occurred in two months after the first symptoms which were an enormous appetite and thirst with rapid loss of weight. The coma lasted only one day, and intravenous injection of sodium bicarbonate did not seem to have any effect. The leukocytes numbered 30,000 and the sugar content of the cerebrospinal fluid was 5.8 per thousand; of the urine, 50 per thousand. The liver and spleen were apparently normal even under the microscope.

Bulletin de l'Académie de Médecine, Paris

June 12, LXXVII, No. 24, pp. 755-776

43 *Isolation and Treatment at Paris of Tuberculous Soldiers. Mesureur.—p. 768.
44 Functional Lung and Heart Disturbances after War Wounds of the Chest. E. Sergent.—p. 770.
45 Surgical Pneumothorax. R. Le Fort.—p. 772.

43. **Isolation and Treatment of Tuberculous Soldiers at Paris.**—Mesureur is chief of the entire public hospital system at Paris, the *Assistance Publique*. He here reports what has been accomplished since the municipal authorities in March, 1916, appropriated over $1,000,000 to erect barracks for tuberculous soldiers. By May, 1917, ten pavillions were in operation, with accommodations for 700 men. They were erected on the grounds of nine Paris hospitals, including the Laennec and the Salpétrière. Other pavillions with a total capacity of 1,400 beds are being constructed on the grounds of four large hospitals in the suburbs. Some of the pavillions, such as the one at the Tenon Hospital, have been constructed of reenforced concrete. For a capacity of 600 beds this costs per bed only 2,500 francs instead of the 7,500 francs required for stone, brick and iron ($500 instead of $1,500). The soldiers are distributed in the pavillions according as they are taking sanatorium treatment or are convalescing or in advanced stages of the disease. There are numerous advantages in thus having the tuberculous soldiers within close reach of their families, either in the city or suburbs.

Journal de Médecine, de Bordeaux

June, LXXXVIII, No. 7, pp. 123-144

46 Trench Foot and Its Prophylaxis. G. Jeanneney.—p. 123.
47 Vaccination against Typhoid and Paratyphoid after Attack of Typhoid. L. Verdelet and P. Lande.—p. 126.
48 Recent Legislation against Habit-Forming Drugs Hampers Treatment of Syphilis, etc. W. Dubreuilh.—p. 127.
49 *Importance of Iodin in the Fight against Tuberculosis. L. Boudreau.—p. 129.
50 Physiotherapy of Cicatricial Adhesions after War Wounds. Fraikin.—p. 132.
51 *Combinations of Mercury in the Organism. P. Carles.—p. 134.

49. **Iodin in Treatment of Tuberculosis.**—Boudreau reiterates that iodin has an actual curative action in many cases of pulmonary tuberculosis, but it has to be given properly. The patient must be gradually accustomed to it, taking it fractioned into as many doses as possible during the day. He commences with one drop of tincture of iodin repeated six or seven times during the day, adding this drop to the usual beverage at the meals. The next day two drops are given at each dose, the third day three drops, and so on, gradually increasing to thirty, sixty, ninety drops or more, according to the way the stomach bears it and the individual need for it. He has patients who finally reach doses of several hundred drops and keep this up for months or even years. He has never had any real inconveniences with this method of treatment. Iodism is encountered with iodids, not with iodin. He is convinced that the tuberculous do better at home in the long run, under the surveillance of the physicians, than in the hospital. The iodin treatment can be applied better in the home, and he urges its systematic application according to this effectual method. The asphyxiating drift gases of modern warfare have been an important factor in the recrudescence of tuberculosis in the trenches. (The French tincture of iodin contains one part of iodin to twelve parts of alcohol.)

51. **Fate of Mercury in the System.**—Carles refers in particular to the insoluble combination of mercury with the sulphur in vegetables and other foods or sulphur dust inhaled in factories or in spraying fruit. The mercuric sulphid thus formed during mercurial treatment is insoluble in plain water but it is easily dissolved in most sulphur alkaline mineral waters. This explains their efficacy in treatment of those "saturated with mercury."

Le Nourrisson, Paris

May, V, No. 3, pp. 129-192

52 *Infection with Disease of the Digestive Tract in Infants. A. B. Marfan.—p. 129.
53 Women's Work in Munitions Factories. E. Apert.—p. 153; A. B. Marfan.—p. 165.

52. **Infection with Gastro-Enteritis in Infants.**—Marfan concludes his historical and critical study of this subject with the statement that, aside from disease due to a specific microbe such as cholera, etc., infection has too contingent and too variable an action, it is too dependent and often too difficult to determine, to allow infection to be the basis of classification and nomenclature of the digestive affections in infants. He warns further that secondary diarrheas are far more common than is generally recognized. When an infant has digestive disturbances, we must not be too hasty in ascribing them solely to improper feeding. We must examine whether some general malady is not responsible for the digestive trouble. This may disclose occult tuberculosis or overlooked syphilis. On treatment of the causative trouble, the diarrhea may subside, while treatment of the latter alone would be futile. This is especially liable with inherited syphilis. He declares that it has not been definitely proved to date that any special type of diarrhea in infants is due to any special pathogenic microbe (aside from dysentery, cholera, typhoid, tuberculosis and syphilis).

Paris Médical

June 9, VII, No. 23, pp. 485-500

54 Work in the Country for Disabled Soldiers. Cestan, Dalous and P. Descomps.—p. 486.
55 *Uncontrollable Vomiting in Soldiers. C. Nordman and Goiffon.—p. 492.
56 Subacute Syphilis of the Lung: Three Cases. G. Boudet.—p. 495.

55. **Uncontrollable Vomiting in Soldiers.**—Nordman and Goiffon pass over the vomiting due to injury of nerve centers from wounds or tabes. Between the strictly neuropathic vomiting and the vomiting from organic stomach trouble, stands what they call reflex vomiting. A neuropathic predisposition is reenforced by a reflex starting in some focus of irritation, usually in the colon. There is a history of old or recent intestinal trouble, and the vomiting phase develops when diarrhea has given place to constipation. The vomiting comes on during digestion and usually following some abrupt movement of the abdomen, stooping over, getting up from table or other exertion. The temperature is always a little abnormal, and runs up after an hour's walk. No signs of stenosis can be found even with roentgenoscopy, but the latter shows how the vomiting attack starts with a massive contraction of the stomach, forcing contents out at both ends. Treatment should be addressed to the intestinal trouble, with measures to lower the reflex threshold, and avoidance of abrupt movements after eating. No drugs gave more than transient relief. The main point is to recognize these cases early and give suitable treatment before the antiperistaltic movements become a settled habit.

Presse Médicale, Paris

June 4, XXV, No. 31, pp. 313-328

57 *Etiology and Different Forms of Inflammatory Stenosis of Esophagus in Cardia Region. J. Guisez.—p. 313.
58 Grave Form of Trench Foot. E. Chauvin.—p. 317.
59 *Gluteus Reflex as Sign of Sciatica. F. Rose.—p. 319.
60 Factors Cooperating in Malaria. C. Garin.—p. 319.
61 Present Status of the Duodenal Tube. M. Romme.—p. 321.

June 7, No. 32, pp. 329-336

62 The Variations in Cholesterolemia during the Menstrual Cycle. A. Chauffard.—p. 329.
63 Origin and Treatment of Vicious Attitudes of the Feet, of Neuropathic Origin, after Traumatism of the Legs. P. Descoust.—p. 330.
64 Sulphur and Eucalyptol in Treatment of Psoriasis. L. Bory.—p. 331.
65 Disinfection of the Peritoneum with Alcohol. I. Tansini.—p. 336.

57. **Inflammatory Stenosis of the Esophagus Close to the Stomach.**—Guisez comments on the absence from the textbooks of descriptions of inflammatory stenosis in the cardia or close above. The stenosis from this cause has been brought to our attention by the findings on direct visual inspection and by the correction of the stenosis by progressive dilatation, as if it were of cicatricial origin. The trouble is a thickening of the walls of the lower esophagus from hypertrophy or fibrocicatricial degeneration, the whole forming a constricting ring or the constriction may involve more or less of the walls of the esophagus. The esophagus becomes dilated above, and the mucosa shows signs of old inflammation. He was able to trace the trouble to an initial spasm of the esophagus, and this in turn to imperfectly masticated food, either from bolting it in haste or from lack

of teeth to chew it. In a recent case the esophagus was completely obstructed; the trouble had begun directly after the man's set of false teeth had been broken so that he was unable to chew. In many cases of this inflammatory stenosis the assumption of cancer seemed justified and apparently confirmed by the patient's death, when in reality he merely starved to death. A foreign body may lodge at the stenosis and cause complete obstruction; this was the finding in several of Guisez' cases. In fourteen others a cancer developed at the spot after several years of spasmodic dysphagia. In examination he uses a catheter softened in very hot water; this shows the site of the stenosis, but he warns against trying to push the catheter through, as the tip is liable to get into some recess. Direct visual inspection is more instructive, and he reproduces a number of views obtained with the esophagoscope. The preferable technic for this is described.

In three of his patients the stenosis had been erroneously ascribed to the cardia, and gastro-enterostomy done. Others had been long treated with gastric lavage, but the majority had been classed as cases of cancer. The aspect and general condition may be the same in both, and only the recovery under treatment proves decisive. The progressive dilatation should be done along the same lines as for stenosis of the urethra, but when the stenosis is from a hard ring, circular electrolysis may be necessary. A long, hollow, bougie-like cap fitting over a whalebone guide, with a string emerging from the mouth, serves the purpose of progressive dilatation while at the same time permitting ingestion of fluid food. The diet should be semifluid, avoiding sugar and milk as they ferment in the esophagus. By a combination of these simple measures he has always succeeded in curing his patients while previous operations on the stomach had never induced any benefit.

59. **The Gluteus Sign of Sciatica.**—The patient lies prone, relaxing the gluteal muscles. Rose then taps on the point of attachment of the gluteus maximus on a level with the second, third and fourth parts of the sacrum. This muscle then contracts; this contraction is exaggerated in case of true sciatica.

Progrès Médical, Paris

May 26, XXXII, No. 21, pp. 169-178

66 Case of Muscular Atrophy of Reflex Origin. R. Oppenheim and G. L. Hallez.—p. 171.
67 *Wounds of the Eyeball. Bourdier.—p. 173. Conclusion.
68 Frame to Aid the Blinded Soldier in Writing. (La rééducation de l'écriture par la "Tablette Verdon".) E. Ginestous.—p. 176.

67. **Wounds of the Eyeball.**—Bourdier concludes his study of treatment of wounds of the eyeball with statistics showing the constant improvement as the war progresses, and suitable measures can be applied early. De Lapersonne has called attention to the gravity of injury from minute scraps of metal. Fully half of the totally blinded lost their vision from bilateral iridocyclitis following a comparatively insignificant injury of this kind. All the evidence is in favor of early extraction of the foreign body. The crystalline lens seems to tolerate the presence of a foreign body better than the vitreous body. Bourdier says that avoidable accidents were responsible for 344 out of 1,021 wounds of the eyeball in his service since the war began, and in over 35 per cent. of the 314 penetrating wounds. All protecting goggles interfere with vision, reduce the visual field, and they cannot be used at all at night.

Correspondenz-Blatt für Schweizer Aerzte, Basel

June 16, XLVII, No. 24, pp. 753-784

69 No Habituation of Fever Center to Fever-Inducing Substances. M. Cloetta.—p. 753.
70 *Ear Disease in the Swiss Army. E. Schlittler.—p. 757. Conclusion.
71 Emetin and Liver Abscess. Paravicini (Yokohama).—p. 772.

70. **Ear Disease in the Swiss Army.**—Schlittler comments on the appallingly large percentage of cases of ear disease in the Swiss army, similar to what Mauthner reported in 1915 in regard to the Austrian army, and Ostmann in 1900 for the German army. Acute infections, trauma, etc., we are unable to ward off, but chronic otitis media we can attack. This forms 25 per cent. of the total cases and is the cause of rejection of 45 per cent. of the recruits (50 per cent. according to Mauthner). Thorough treatment in time cures in the majority of cases. This is one of the greatest benefits from school inspection, as chronic otitis media generally begins in childhood, following some infectious disease, under the injurious influence of adenoids with obstruction of the eustachian tubes. Laubi at Zurich found 2,500 deaf children among the 23,000 examined and a fifth of them had or had had chronic disease of the middle ear. Bezold and others found elsewhere still higher percentages. Schlittler states that at Basel twenty-five with chronic otitis media were found among 113 quite deaf children last year. By curing the chronic disease of the middle ear in children, we prevent such losses to the army as now prevail from the large numbers of deaf recruits. In conclusion he mentions that the examining physician must remember that while some recruits and soldiers feign deafness in order to be discharged from the army, others who are really deaf may conceal this infirmity as they prefer military to civilian life.

Gazzetta degli Ospedali e delle Cliniche, Milan

May 20, XXXVIII, No. 40, pp. 601-616

72 Triple Standard for Immobilizing while Plaster Cast is being Applied. D. de Francesco.—p. 604.
73 Conservation of Milk with Gas. C. Rapa.—p. 616.

May 24, No. 41, pp. 617-624

74 Roentgenoscopy for Abdominal Wounds. V. Maragliano.—p. 617.
75 Progressive Duodenal Ulcer. G. B. Queirolo.—p. 620.

Policlinico, Rome

June 17, XXIV, No. 25, pp. 785-812

76 *Camphor in Cardiovascular Disease. P. Marfori.—p. 785.
77 The Individual Case Chart to Accompany the Sick and Wounded. S. Ottolenghi.—p. 787.
78 *Necessary Revision of Exemptions from Military Service. G. Galli.—p. 790.

76. **Camphor in Treatment of Cardiovascular Disease.**—Marfori pleads that camphor should not be reserved for a last resort in serious conditions, but should be regarded as a useful drug in small doses for dilating the vessels to reduce the blood pressure both in the greater and the lesser circulation. Nothing can compare with camphor, he asserts, to stimulate the heart and regulate the pulse in cases of chronic myocarditis with simple cardiac insufficiency, with arrhythmia, with auricular fibrillation. The benefit from camphor may persist after its suspension, but as a rule it should be given systematically, over long periods. The camphor can be given in subcutaneous injections of camphorated oil, one or two a day, each with 0.1 gm. camphor. Or it can be given in pill or other form by the mouth; it is borne well and may have a useful influence on the digestive tract. In valvular disease, when the predominating disturbances are hypertension in the right ventricle and lesser circulation, camphor is the most rational treatment and, in his judgment, the most effectual. Insufficiency with several forms of vascular disease is often directly connected with stomach-liver trouble inducing dilatation of the right heart and spasm of the pulmonary vessels. The almost elective action of camphor under these conditions shows that it may be regarded as the medicine for the right heart. Whenever the heart is compelled to work harder on account of increased resistance in the respiratory domain, then camphor is called for, as with the pulmonary sclerosis of the tuberculous. Camphor can also be given with advantage in cases of high arterial pressure from hypertrophy of the heart or vascular spasms, as with the high pressure of the menopause, with arteriosclerosis, etc. This work issues from the Institute for Pharmacology and Therapy of the University of Naples, and is based on considerable experimental as well as clinical experiences.

78. **Heart Disease and Military Service.**—Galli is chief of the special medical service for soldiers with heart affections, and his long experience has convinced him that valvular affections should be judged by the functional rather than the anatomic findings. He reiterates that warfare is a complicated mechanism, with all kinds of large and small gear, subjected to different degrees of attrition. They are all

equally important, each in its own line, and useful places can be found for capable men with valvular or other heart disease who can safely do excellent work at posts where the attrition is less. The French regulations classify the service as *armé* and *auxiliaire* and the advantages of this are obvious. The man with well compensated heart disease is likely to benefit by the army life in the auxiliary service, office work, garrison duty, etc., while he releases an able-bodied soldier for the *service armé*. The state will have less pensions to pay as they will not break down in the auxiliary service. This arrangement also reduces the number of cases of neuroses. He cites the report of a pathologist who found evidences of arteriosclerosis of the aorta and coronaries in 45 per cent. of sixty young soldiers supposedly entirely healthy when killed.

Riforma Medica, Naples

June 2, XXXIII, No. 22, pp. 589-608

79 The Preventorium in the Campaign against Tuberculosis. A. Pirera.—p. 589.
80 Old Colonies Differ in Response to Decolored Stain Tests for the Cholera Germ. A. Azzi.—p. 593.
81 Dysentery from Protozoa. C. Vallardi.—p. 594. Conclusion.

Prensa Medica Argentina, Buenos Aires

June 10, IV, No. 1, pp. 1-12

82 *Difficulty of Individualizing the Diagnosis and Prognosis in Pulmonary Tuberculosis. G. A. Alfaro.—p. 2.
83 *The Cardiovascular Lesions in Two Cases of Severe Myopathy. J. C. Navarro and C. Correas.—p. 4.
84 *Hematemesis in Gastric Crises of Tabes. C. B. Udaondo.—p. 6.
85 Acute Abdominal Diseases. R. E. Pasman.—p. 8. Continuation.

82. **Prognosis of Pulmonary Tuberculosis.**—Alfaro insists that tubercle bacilli in the sputum are of less moment for prognosis than continued clinical observation of the case as a whole. The experiences with induced pneumothorax and climatic treatment have proved that even advanced and destructive cases may become arrested and heal.

83. **Cardiovascular Disturbances with Muscle Disease.**—Chronic myocarditis was found at necropsy of a boy of 11 with a serious muscular affection. In a second similar myopathy case, a girl of 11 was completely crippled, the myopathy following an attack of measles at the age of 5. The legs were permanently flexed at angles of 90 and 120 degrees and there was extreme muscular atrophy. The latter had not yet developed in a third case still in the initial stages. There was marked sclerosis of the vessels in the fatal case and this seems evident or probable in the two still living children. Muscle tissue has been replaced with connective tissue, and the latter has invaded the vessels also. In still another case of progressive myopathy the arterial pressure is exceptionally high and the heart dulness much enlarged, especially the right side.

84. **Hematemesis in Gastric Crises of Tabes.**—Udaondo reports two cases in which an operation was done on the stomach for recurring hematemesis from assumed ulcer. No lesions were found, but gastro-enterostomy was done. The pains recurring afterward as before, finally led to recognition of the tabes and improvement followed mercurial and sedative treatment. In one case the first symptoms, pain in the limbs, had appeared four years before, and the gastric symptoms a year later. In the second case pains in the stomach and vomiting were the first signs of trouble. The man vomited more or less blood on several occasions in the following four months, and gastro-enterostomy was done. Neither of these patients had had previous stomach trouble, and the hematemesis occurred at the height of the pains. The blood was always of the coffee-grounds aspect. One patient estimated that he had vomited a pint of blood on one occasion. The fact that the hematemesis never occurred during an interval between pains should aid in differentiation in similar cases. Siding reported a case in 1909 in a woman of 62 with hematemesis and lacteal secretion and also recurring atypical herpes zoster. Another differential point is the absence of stomach symptoms during the intervals between the attacks of pain. In his experience with tabetic gastric crises, hypoacidity was the rule except during the crises.

Revista de la Asociacion Medica Argentina, Buenos Aires

May, XXVI, No. 150, pp. 419-594

86 Unusual Form of Pigmented Retinitis. R. Argañaraz.—p. 419.
87 *Operative Treatment of Gastric Cancer. A. J. Bengolea.—p. 426.
88 Colectomy for Acquired Megacolon. A. Ceballos.—p. 471.
89 History of Bubonic Plague. A. M. del Pont.—p. 477. Continuation.
90 *Papillomatous Form of Venereal Granuloma. A. H. Roffo and J. A. Farini.—p. 550.
91 Secondary Nutritional Disturbances in Tuberculous Infants. F. Schweizer.—p. 570.
92 *Protecting Salve for the Surgeon's Hands. T. Varsi.—p. 578.

87. **Gastric Cancer.**—Bengolea describes three typical cases with twenty-four illustrations to show the preferable technic for total or subtotal gastrectomy. Mayo calls it the Polya method, but Bengolea thinks that Delagenière published the same technic three years earlier.

90. **Venereal Granuloma.**—The lesions in the case described extended from high up in the inguinal region to back of the anus, with extensive papillomatous hypertrophy, in the course of seven years, but there was no impairment of the general health. The same parasitic elements first discovered by Donovan in 1905 were found in the smears, and prompt benefit followed intravenous injections and local application of antimony and potassium tartrate.

92. **The Surgeon's Hands.**—Varsi paints with iodin the nails, then scrubs with running water and soap, wipes dry and then applies petrolatum containing 4 per cent. eucalyptol and 2 per cent. thymol. This sterilizes and protects the hands against both germs and irritations of all kinds, and he has found this method of caring for the hands absolutely reliable.

Revista de Medicina y Cirugia, Havana

June 10, XXII, No. 11, pp. 273-296

93 *Pseudomyxoma of the Peritoneum. J. A. Presno.—p. 275.

June 25, No. 12, pp. 297-320

94 *Clonorchis Sinensis in Cuba. P. L. Querens.—p. 297.
95 Child with Two Heads and Necks. (Monstruo derodimo.) J. M. Cabarrouy.—p. 305.
96 *The Cause of Appendicitis and Means to Ward It Off. A. Lorand (Carlsbad).—p. 309.

93. **Pseudomyxoma of the Peritoneum.**—Presno recalls that the condition in which the abdominal cavity contains a quantity of jelly-like substance, has been called *maladie gelatineuse* or pseudomyxoma of the peritoneum. Much confusion has been caused by the indiscriminate use of the terms "colloid" and "mucinous substance" in describing the jelly-like substance in question, as the origin of colloids and of mucin is quite distinct, as also the prognosis. Rupture or metastasis of colloid ovarian cysts is of a cancerous nature, while pseudomyxoma from rupture of a mucin cyst is not malignant. Presno has encountered three cases in which the pseudomyxoma was the result of perforation of the appendix distended with the jelly-like substance. He says that sixteen such cases had been published by 1912, and a number have been reported since. Elbe compiled in 1909 over 150 cases of cysts or cystic dilatation of the appendix, but neither he nor Kelly mentions pseudomyxoma of the peritoneum as a consequence of rupture of an appendiceal cyst. The jelly-like substance as analyzed by Sarvonat consists of mucin with traces of fat and cholesterol, but no colloid. Presno's patients were three women between 22 and 38 with a history of chronic or recurring acute appendicitis. All were cured by appendicectomy and clearing the peritoneum from the jelly-like masses. No signs of metastasis or recurrence have been detected in any instance during the years to date.

94. **Clonorchis Sinensis in Cuba.**—Querens reports what he thinks is the first case to be published in Cuba of this intestinal parasite. He quotes freely from Gunn's article in THE JOURNAL, Dec. 16, 1916, p. 1835, and warns against the danger of this parasite getting a foothold in Cuba. His patient was a Chinese laborer at Preston in eastern Cuba. He had been living in Cuba for eight years, and claimed to have been always in good health until four years ago when a dull ache and oppression attracted attention to the liver region. The symptoms gradually became more severe and during the last year he lost weight and for four months had been vomiting after meals. There was also diarrhea and finally slight chills

every day with fever. The discovery in the stools of the very small eggs of the clonorchis cleared up the puzzling diagnosis. The malaria parasite was found in the blood and quinin was given, but the condition grew progressively worse, the vomiting uncontrollable, with death the tenth day. In prophylaxis, besides measures to prevent the importation of the parasite it is important to boil the drinking water and cook most thoroughly all marine food, as, in Japan at least, the intermediate host has been shown to be a fish.

96. **Prophylaxis of Appendicitis.**—Lorand calls attention to the rubbing of the psoas muscle on the appendix as impeding the evacuation of the appendix and also as a cause of irritation. In a naturally large appendix the mark made by the pressure of the psoas on the appendix is quite noticeable. When the psoas is relaxed, the appendix rests on it peacefully; but when the psoas is exercised the appendix may be tossed about, its outlet squeezed together, and a predisposition to appendicitis develops. Running, skating, bicycling and sitting with the legs crossed all keep the psoas at work, and the appendix suffers. This can be discovered by having the right foot raised as high as possible while the right hand compresses the muscle. If there is latent appendicitis, pressure with the left hand on McBurney's point will induce intense pain. By this means it is possible to diagnose appendicitis in its initial stage. When this is discovered, all exercise straining the psoas muscle must be forbidden and the intestines kept open. Even when the pain is quite acute, the trouble may be merely from impacted feces or retained gases, and when the bowel is cleared out the pain can no longer be elicited. Another possible cause for appendicitis is sympathetic disturbance with inflammatory processes in the tonsils, the whole endocrine system being liable to share in pathologic conditions involving even only one link in the chain. He has often noticed hypertrophy of the tonsils with myxedema, exophthalmic goiter, acromegaly, diabetes, etc. The tonsils may likewise affect the appendix by infectious matter from them reaching the bowel. Adenoids may also contribute indirectly to pathologic conditions in the appendix.

Semana Medica, Buenos Aires

May 10, XXIV, No. 19, pp. 539-562

97 Nasal Treatment of Asthma. A. Quadri.—p. 539.
98 Gastrulation in Mammals. (Por ultima vez el canal neurenterico.) M. Fernandez.—p. 544.
99 History of Public Health Service in Argentina. E. R. Coni.—p. 547. Conclusion.

Siglo Medico, Madrid

June 2, LXIV, No. 3312, pp. 385-404

100 *Case of Transparent Peripheral Ectasia of the Cornea. Marquez.—p. 386.
101 Hygienic Measures in Treatment of Pulmonary Tuberculosis. L. Calandre.—p. 387. Continuation.

June 9, No. 3313, pp. 405-424

102 *The Pains with Kidney Stones. A. P. Martin.—p. 406.
103 Excision of Entire Rectum. A. Morales.—p. 409.
104 Diathermy in Gynecology. Poblacion.—p. 417. Continuation.

100. **Marginal Ectasia of the Cornea.**—Marquez' patient was a man of 46 who complained of impaired vision in the right eye. A white line, like the senile arc, ran along the outer margin of the cornea. It bifurcated to form a crescent enclosing the area of ectasia, which comprised the two inner thirds of the upper semicircumference of the cornea. The first sign of the anomaly was noted at the age of 10. The astigmatism was — 55 + 145 degrees 21 D. The patient would not accept the proposed removal of the ectasia with the actual cautery. This proved successful in Terrien's case with 0.5 and 11 D.

102. **The Pains with Kidney Stones.**—Martin describes the manifold forms of pain that may be induced by renal calculi. Besides actual kidney colic, there may be pain and discomfort during movements, induced pain, reflex pain and crossed pains. Pain in the urinary apparatus during exercise is suspicious of kidney stones. The patient during examination should be told to jump, and the sensibility then be tested anew. Crossed pain is liable to mislead into serious error. In one case of this kind a boy of 11 after having had a stone removed from the urethra, developed severe pain in the right kidney region when he moved about. The right kidney was tender on palpation from front and rear. The urine was bloodstained one day after fatiguing exercise but at all other times was apparently normal. A radiogram of the right kidney showed normal conditions there, but a peculiar shadow farther along proved to be that of a stone in the left kidney. He has been free from all trouble since the removal of the oxalate-urate stone by nephrolithotomy on the left kidney.

Russkiy Vrach, Petrograd

XVI, No. 9, pp. 193-216

105 *Scurvy, and General Measures in Prophylaxis. (O tsingyie.) A. I. Shibkoff.—p. 193.
106 *Mortality from Erysipelas in Relation to Location and Age. (O rozhi.) N. M. Ivanoff.—p. 198.
107 *Smallpox Scares and Vaccinations. N. T. Gamalieya.—p. 201.
108 *The Rapidity of the Rise in the Pulse Rate. V. L. Yanovsky.—p. 204.
109 *Auricular Fibrillation with Heart Block. N. I. Leporsky.—p. 205. Conclusion.
110 Suggestions for Simpler and Less Expensive Artificial Limbs. V. N. Filkoff.—p. 209.
111 Adjustable Band to Protect against Secondary Sudden Hemorrhage from Large Vessels After War Wounds. N. M. Viner.—p. 210.

105. **Scurvy.**—Shibkoff urges that housing conditions are an important factor in scurvy, as foodstuffs are liable to mold and spoil in the damp houses of the Russian peasants.

106. **Erysipelas.**—Ivanoff tabulates the details of 5,270 cases of erysipelas in the last three years at a hospital for women at Petrograd. The total mortality was 4.4 per cent. but it was much higher with advancing years, being only 1 per cent. up to 20 and increasing progressively to 8 and 14 per cent. at 50, 60 and older. In the young the face was the seat of the erysipelatous process twice as often as in the older patients.

107. **Smallpox Scares and Vaccination.**—Gamalieya tabulates statistics showing a total of 414, 143 cases of smallpox in European Russia, 1909-1910, including 1,739 cases in Petrograd. Among the measures in vogue against it are house-to-house vaccinations when the disease is so prevalent as to arouse a smallpox scare. But this is waste of energy, it is asserted. There should be an ample vaccination force and regulations to enforce vaccination on those that really require it, not waiting for the smallpox scare and then have the vaccination done ineffectually, and wasted on persons who do not need it.

108. **The Pulse Coefficient.**—Yanovsky has published a number of articles in the last nine years to call attention to the practical advantages of mathematical accuracy in estimating the work of the heart. This is particularly useful, for purposes of comparison, with arteriosclerosis, as he describes in detail here. The coefficient celeritatis pulsus, CCP, is the square root of the quotient obtained by dividing the square of the pulse pressure, PP, by the product of the time required for the rise of the pulse wave, TAP, multiplied by the time required for the decline of pulse wave, TDP. In this communication he introduces a new element to add to the precision of the formula, namely, the rapidity of the rise of the pulse wave, the celeritas ascensionis pulsus, CAP. This figure is calculated from the ratio between PP and TAP.

109. **Heart Block with Fredericq Symptoms.**—The fibrillation of the auricles was accompanied by bradycardia of the ventricles, dissociation being complete, in the case described with much detail by Leporsky. The left ventricle also showed pronounced hypersystoles with hyposystole in the right ventricle. The auricular fibrillation changed to a slower rhythm, namely, tachysystole, probably from the influence of the medication, digitalis and inhalation of oxygen. The case thus presented simultaneously the Adams-Stokes syndrome and the Fredericq syndrome. The latter must therefore be regarded as occurring in two groups, cases with and without the Adams-Stokes symptoms.

Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

May 12, I, No. 19, pp. 1527-1622

112 *Roentgenograms Showing What Seem to be Calculi but which are not. (Pseudonierensteenen.) N. Voorhoeve.—p. 1528.
113 *Deficiencies of Present Methods of Fighting Contagious Diseases. P. W. Onnen.—p. 1535.

114 *Electrocardiograms of Frog Heart under Influence of Antiarin. H. C. Rümke.—p. 1551.
115 *Comparative Mortality of the Sexes. J. P. H. Kroon.—p. 1564.
116 Case of Intraperitoneal Rupture of the Bladder. H. Jonker, Jr. —p. 1571.

112. **False Kidney Stones.**—Voorhoeve is instructor in roentgenology at the University of Amsterdam, and he here gives six roentgenograms showing shadows which seemed to be cast by unmistakable calculi in the kidney. They proved, however, to be merely the shadows of gallstones, or of a tuberculous cavity with calcified content, or an old calcified echinococcus cyst. Small tumors and local thickenings of connective tissue are also liable to cast faint shadows which may be misleading. One patient had passed a kidney stone without colic and had no further trouble until six months ago when urination became painful and the urine contained traces of albumin and blood corpuscles. A shadow was evident in the superior pole of the kidney, but its peculiar location and the fact that it was not a dark shadow, while the outline was irregular and not well defined, and the shadow of the kidney tissue around was rather lighter than usual—all suggested a calcified tuberculous cavity. This was confirmed by discovery of tubercle bacilli in the urine and by the findings at nephrectomy. His experience demonstrates the incorrectness of the tradition that gravel does not cast a shadow. In one woman two calculi were found when the kidney was opened, but the third stone shadow proved to be merely from a mass of gravel. Six roentgenograms show these various findings. The calcified collapsed echinococcus cysts cast sharp, regular shadows, the outer part dark, with a lighter center. A roentgenogram taken with the plate against the abdominal wall gives better shadows. Gallstones cast smaller shadows under these conditions.

113. **Inadequacy of Present Measures of Prophylaxis against Contagious Diseases.**—Onnen discusses the experiences with diphtheria, scarlet fever, typhoid and measles in the Netherlands in recent years and the lessons to be learned therefrom. They emphasize the necessity for placing the oversight over diphtheria and typhoid in the locality, each in the hands of one person who is supplied daily with all the data concerning these diseases in the place and also in the districts surrounding it, and the local conditions for combating it, and his authority, even if only advisory, is recognized by the local administrative authorities. The absence of one or more of these four factors proved disastrous in some districts in the Netherlands, and also division of responsibility, instead of having one person at the head of the whole prophylaxis against each one of these diseases. He reviews in particular the experiences in his own district, where he is an officer in the board of public health. In the last ten years there had been from 3 to 7 cases of scarlet fever every year until 1913 and 1914 when there were 21 and 10 cases, respectively. Special efforts were made to seek out in the schools and render harmless all abortive cases, and cases of "fourth disease," and other eruptions with fever. The value of thus stamping out possible sources of infection is evident from the fact that the following year not one case of scarlet fever developed in the whole district. During the same ten year period there were 90 deaths from measles, over two thirds in children under 2. None died among the children over 7 with measles. The importance of warding off measles infection from very young children is emphasized anew by these figures. This can be done efficiently only with notification of measles. Prophylaxis on this basis is particularly imperative in day nurseries, kindergartens, etc. Only 3 of the total 90 deaths were in children over 6. Onnen comments on the difficulties encountered when a physician tries to keep up his practice while serving on the public health board. Individual and public interests are liable to conflict and hamper his work; it is much better, he declares, to have a salaried whole-time public health officer in charge of the measures against contagious diseases.

114. **Experimental Research on the Heart to Explain the Electrocardiogram.**—Rümke experimented with the frog heart under the toxic influence of antiarin. The changes in the rhythm of the heart beat shown by the tracings and also by the electrocardiograms suggest an explanation of the nature of the latter.

115. **Comparative Mortality of the Sexes.**—Kroon analyzes the mortality statistics of the Netherlands for males and females at different ages. The almost universal higher mortality of males over females at corresponding ages is most pronounced the first year of life. For each 100 girl babies that died between 1910 and 1914, 139 boys died in the first two months of life; 134, third month; 130, fourth; 127, fifth; 123, sixth; 115, seventh and eighth; 113, ninth and tenth, and 111, the eleventh and twelfth months. Tschuprow once reported that the number of stillborn male children had been four times that of the female at the large maternities of Vienna and Budapest. By the age of 10, the mortality in girls everywhere exceeds that of boys; Australia seems to be the only exception to this rule. In the Netherlands, the mortality among boys from 10 to 18 does not average much above 80 per cent. of the mortality in girls. But with 18 it begins to run up again and keeps above the female mortality throughout the rest of life. One table shows that the mortality of unmarried men is 141 to that of 100 unmarried women, and 172 to that of 100 married men. The mortality of unmarried women is only 72 compared to that of 100 married women. These figures embrace the age period of 20 to 25. At 50: 129, 132 and 131. Other tables show that married men have a much lower mortality than married women (from 59 to 73 per cent.) up to the age of 40, but then the mortality excess changes and the men show a mortality of 120, 128 and 126 which gradually declines to 103 in the eighties. The excess mortality of married over unmarried women up to the age of 40 changes then abruptly, the mortality being much higher in the unmarried from 40 to 50, namely, 101, 130 and 131. Above this age it runs from 121 to 104, and drops to 100 at 70 and 80.

Hospitalstidende, Copenhagen

June 6, LX, No. 23, pp. 549-572

117 Case of Complete Masculine Pseudohermaphroditism. P. Møller. —p. 549.

Ugeskrift for Læger, Copenhagen

May 24, LXXIX, No. 21, pp. 813-854

118 Functional Tests of the Liver. J. P. Gregersen.—p. 813. To be continued.
119 *Morbidity under Prohibition. (Alkoholforbudets Virkninger paa Kommunehospitalets VI Afd.) H. I. Schou.—p. 823.
120 *The Question of Specialization in Medicine. T. Rovsing.—p. 828.

119. **Morbidity under Prohibition.**—In this communication from the Copenhagen public hospital, Schou compares the number of cases of delirium tremens and of trauma in drunken men during a period of municipal total prohibition and the period before it, and during a period of partial prohibition in that a supposedly prohibitive price had been placed on liquors. The cases of delirium tremens in the last four or five years have averaged five or six a week, but during the total prohibition period weeks passed without a case. During the partial prohibition period there were also weeks without cases of delirium tremens but the number of "drunks" was even higher than usual, the restrictive measures evidently failing in their purpose. Schou remarks that the weeks of peace and quiet in his service under total prohibition are now past, as drunkenness is as common as ever under the restrictive price, the so-called partial prohibition, but he does not expect the number of cases of delirium tremens to return to the old level, as it takes brandy to produce delirium tremens, and this is scarcely obtainable.

120. **Specialization in Medicine.**—Rovsing discusses this question from both the practical and the scientific standpoint. The Danish Medical Association is now engaged in revising the lists of specialists in Denmark, a general medical or surgical training being now regarded as indispensable as well as the training in the special branch. The only organization of Danish specialists who refuse to accept these views, he says, are the alienists. They insist that a broader training in medicine is not necessary as a basis for care of mental disease, but he adds that they too in time, will have to admit the necessity of what every one else regards to be right.